This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 942,495

PROPERTY OF THE
University of Michigan Libraries
1817
ARTES SCIENTIA VERITAS

1645.5

MIND IN THE LOWER ANIMALS

IN HEALTH AND DISEASE

BY

W. LAUDER LINDSAY, M.D.

F.R.S.E., F.L.S.

HONORARY MEMBER OF THE NEW ZEALAND INSTITUTE

VOL. I.

MIND IN HEALTH

NEW YORK:
D. APPLETON AND COMPANY,
1880.

QL
785
.L75

TO

THE MEMORY OF

MY FATHER

WHO, OF ALL MY MANY CORRESPONDENTS, WAS SURPASSED BY NONE,

EITHER IN HIS GENEROUS, GENIAL, AND GENUINE

SYMPATHY WITH THE DOMESTIC ANIMALS,

OR IN THE SOUND, LIBERAL, AND PHILOSOPHICAL VIEWS

WHICH HE HELD AND EXPRESSED

REGARDING THE NATURE AND EXTENT OF

ANIMAL REASON

CONTENTS

OF

THE FIRST VOLUME.

INTRODUCTION xi

COMPARATIVE PSYCHOLOGY.

GENERAL CONSIDERATIONS, INCLUDING THE METHODS OF ENQUIRY.

CHAPTER

I. Results of Human Ignorance, Error, and Prejudice . . . 3
II Faults and Fancies of Terminology 11
III. Authenticity of Anecdotes of Animal Sagacity 18
IV. Study by Observation and Experiment 29
V. The Dawn of Mind in Man: Mental Condition of Children and Savages 37
VI. Evolution of Mind in the Ascending Zoological Scale:—I. The Invertebrata 51
VII. Evolution of Mind in the Ascending Zoological Scale:—II. The Vertebrata 69
VIII. Animal Reputation 82
IX. Alleged Psychical Differences between Man and other Animals . 100
X. Alleged Intellectual and Moral Supremacy of Man . . . 118
XI. Inter-Relations of Instinct and Reason 126
XII. Unsolved Problems in the Psychology of the Lower Animals . 142

MIND IN THE LOWER ANIMALS:

IN ITS NORMAL MANIFESTATIONS.

MORALITY AND RELIGION.

CHAPTER		PAGE
I.	The Moral Sense in Lower Man	163
II.	The Moral Sense in other Animals	175
III.	Moral Merit and Demerit	186
IV.	Moral Responsibility.	193
V.	Religious Feeling in Lower Man	202
VI.	Religious Feeling in other Animals	218

EDUCATION AND ITS RESULTS.

VII.	Capacity for Education	234
VIII.	Self-Education: the Acquisition of Knowledge by Investigation	246
IX.	Education of Animals by Man	257
X.	Education of Animals by each other	274

LANGUAGE.

XI.	Language in Lower Man	281
XII.	Language in other Animals	289
XIII.	Vocal Language	299
XIV.	Non-Vocal Language	307
XV.	Laughter and Weeping	314
XVI.	Expressiveness of Animal Language	326
XVII.	Intelligibility of each other's Language	334
XVIII.	Animal Motives and their Interpretation by Man	338
XIX.	Understanding of Human Language	346

ADAPTIVENESS.

CHAPTER		PAGE
XX.	General Adaptiveness	357
XXI.	Organisations	377
XXII.	Law and Punishment	397
XXIII.	Use of Natural Instruments	409
XXIV.	Use of Man's Instruments	429
XXV.	Use of Clothing and Shelter	440
XXVI.	Preparation of Food	446
XXVII.	Faculty of Numeration	451
XXVIII.	Power of Calculation	454
XXIX.	Courtship and Marriage	468
XXX.	Foster Parentage	482

FALLIBILITY.

XXXI.	Liability to Error	488
XXXII.	Commission of Error	498
XXXIII.	Commission of Error—*continued*	512
XXXIV.	Deception	523
XXXV.	Practical Jokes	537

INTRODUCTION.

A VARIETY OF CONSIDERATIONS seems to me to render it desirable that I should explain shortly the circumstances under which the following work has been written. On the one hand, for instance, the value of an author's opinion on a given subject necessarily depends on his qualifications for forming and expressing an opinion; which qualifications include the natural bias of his mind, the direction in which his mental qualities have been cultivated, the nature and extent of his opportunities for observation, with the degree to which he has availed himself of his opportunities, the extent and variety of his teaching—in other words, his special experience and aptitude in the investigation of the said subject.

On the other hand, the subject of *Mind in the Lower Animals* is one that has from time immemorial been regarded, if not studied, from the most different points of view, and one that will doubtless continue to be so regarded. Theologians, metaphysicians, psychologists, physiologists, naturalists, physicians, veterinarians, philosophers so called of the most diverse views and feelings, naturally and necessarily approach such a subject actuated by the most conflicting motives and opinions, by prejudice the most unreasonable, by ignorance the most profound.

Now, I have studied the subject of mind in other animals as compared with that of man, for a series of years, simply as a *physician-naturalist.*

As a *physician* it has been the special business of my professional life to deal practically with the phenomena of *abnormal* mentalisation in man—a circumstance that has

from a medical and natural history point of view, I have studied it from first to last without any preconceived ideas —with no theory to defend, support, or illustrate—and ready throughout, without effort or regret, to renounce any belief which *fact* or *truth* might show to be scientifically untenable.

In the course of my enquiries I have amassed far too large a body of notes to condense into a single volume. These notes consist of (1) excerpts from my readings in books, whose nature and names will be found specified in the Bibliography; (2) reflections or criticisms on the statements made by the authorities consulted; (3) correspondence resulting from the publication by authors of doubtfully correct records of facts, or from the confusion of fact and fiction in narrative; (4) my own observations; and (5) reports taken down by me on the spot, or immediately after hearing them, of oral descriptions given by eye-witnesses of incidents illustrative of animal sagacity. In the present volumes—popular as they are in their aim and limited in their size—all that I attempt is to *outline* the subject of *Mind in the Lower Animals*, to illustrate their possession of the *higher mental faculties as they occur in man*, of *reason* as contradistinguished from mere *instinct*.

The work is to be regarded simply as what the French call a 'mémoire pour servir.' It is but a contribution and introduction to the subject of which it treats, and aims only at indicating to the student (1) the spirit and direction in which the said subject ought to be investigated; (2) the claims it has on man's attention; (3) the desirability of an exact separation of what we do from what we do not already know—that first condition of all true knowledge; (4) the new significance of certain facts as interpreted by the light of modern science; and (5) that facts which controvert current popular fallacies or errors are nevertheless facts. The present work offers a certain rough classification of the facts of observation as already recorded, so as, it is hoped, to bring out their relative importance or significance; which classification may assist the reader still further to pursue the study of the subject by pointing out on the one

hand the kind of information already acquired, and on the other that which is still desirable or desiderated.

Designed originally to form a single volume of the International Scientific Series, I have found it impossible, after fruitless efforts at condensation, to compress what must be said in such a preliminary treatise within the compass of one volume of 300 or 400 pages. With the concurrence, therefore, on the one hand of the publishers, and on the other of the committee of the International Scientific Series of books, instead of issuing an incomplete work by the omission of what I regard as its most important half—that which treats of *mental disease*—I have been constrained to cast the whole materials in two volumes, treating respectively of the varied phases or phenomena on the one hand of *healthy*, and on the other of *diseased*, mind.

Anxious as far as possible, in a work intended for *popular* use, to divest the subject of mind in animals of all unnecessary, repulsive, or confusing *technicalities*, I have purposely used the term *mind* itself, and all *terms* relating to its constituents or operations, in their *ordinary*, popular, or comprehensive sense. All men of experience and culture feel, rather than know, what these terms express or imply, though it has been abundantly shown, by the frequent unsuccessful attempts that have been made, how impossible it is to *define* them satisfactorily. Indeed, no two authors agree as to the signification that should be attached to such terms as 'will,' 'feeling,' 'thought,' 'consciousness,' 'intention,' and so forth. So far as I can judge, after a special study of several of the fashionable modern systems of psychology—of mental or moral philosophy—such as those of Herbert Spencer and Professor Bain, I do not think anything would be gained by attempting, in such a work as the present, the strict *definition* of these or similar terms, or their restricted use, solely in a metaphysical, psychological, or other purely scientific or technical sense. I do not, therefore, here attempt *psychological definition or classification*, preferring to permit each reader to define and classify according to his own favourite system of nomenclature and arrangement.

I do not venture to *generalise* beyond a certain safe limit;

the time having not yet come for full generalisation on such a subject as mind in the lower, and especially in the lowest, animals. We want a much greater number of exact and indisputable facts, which must then be duly arranged and indexed; and then, and not till then, shall we be in a position to draw legitimate inferences of an equally comprehensive and accurate kind.

I profess to deal only with the facts of observation, and with the scientific or logical inferences that may be based upon, or drawn from, such facts. I have omitted, therefore, every topic, however interesting in itself, that does not admit of scientific demonstration or legitimate argument or inference—in other words, all that belongs to the region of pure *speculation*. Thus I feel myself compelled to omit a series of chapters on the *soul and its immortality* in the lower animals, concerning which much has been written by some of the most celebrated divines and philosophers of their day, the affirmative opinions expressed by them being such as even nowadays would probably be regarded as heterodox. But neither in man nor in other animals does *soul* admit of scientific demonstration, definition, or discussion at all. Only lately the question has been seriously started, 'Have savages souls?' and so long as *this* is a matter of doubt I may be excused from discussing the possession or non-possession of soul by the so-called inferior creatures. I prefer leaving the subject of its presence or absence—its immortality or annihilation—in the lower animals to those divines or philosophers so called who consider themselves qualified to deal with abstruse speculative questions that belong to the debatable ground equally of theology and metaphysics.

There are certain other topics—all interesting in themselves—which I have also altogether omitted, or have simply alluded to, as being more suitable for exposition in purely medical, scientific, or philosophical works or journals.

To save repetitions in the body of the work, and to afford the means of identification by foreign as well as by British naturalists, I have deemed it desirable to append a list of the scientific as well as the common names of the various animals referred to throughout the volume.

In submitting to the reader in the following pages the conclusions deducible or deduced from my own researches, I do not forget the adage 'Quot homines, tot sententiæ.' I do not expect those who approach the subject from very different points of view to accept either my facts or inferences; or, assuming that the facts are accepted, I cannot hope that other students will draw the same conclusions or form the same opinions. I have no wish to thrust my own views dogmatically on any reader. Rather do I offer him the means of forming an opinion of his own—by giving him, for instance, in the Bibliography the data on which I have partly based my own conclusions.

I plead not for an immediate or even an ultimate acceptance of my opinions, but simply for a dispassionate study of the subject of the mental endowments of the lower animals, convinced that such a study can only eventuate in benefit equally to the student and to the objects of study—these lower animals themselves—whether or not it be conceded that in them *mind is the same in kind as in man.* I hope, whether the reader agree or disagree with me as to the nature and extent of animal mind, at least to establish certain new claims on the part of the lower animals upon man's consideration and kindness.

At all events I can honestly say of my work—

'Tis not the hasty product of a day;

and I must leave it to the reader to determine whether it can be equally truthfully added—

But the well-ripened fruit of wise delay.

COMPARATIVE PSYCHOLOGY.

GENERAL CONSIDERATIONS, INCLUDING THE METHODS OF ENQUIRY.

CHAPTER I.

RESULTS OF HUMAN IGNORANCE, ERROR, AND PREJUDICE.

It may, and probably will, appear to many—perhaps the majority—of my readers a work of supererogation to insist that he who ventures upon the study of *mind in the lower animals* should do so free from bias or prejudice, having his own mind in a state of preparedness for the observation of facts and the deduction of logical inferences from facts; or to stipulate that the student should first possess a proper knowledge of the human mind not only as it is developed amidst the highest civilisation, but in its genesis, growth, degeneracy, and decay in the child, the savage, the idiot, and the lunatic. My own experiences, however, in conversation and correspondence, as well as a varied and extensive reading, leave me in no doubt as to the kind and amount of ignorance, error, and prejudice regarding the mental endowments of animals that are everywhere prevalent, not only among the general public—the *indoctum vulgus*—but among our representative men of the very highest culture—ignorance, error, and prejudice that are illustrated in speeches or writings from the very highest public platforms, from the most influential official positions.

It is desirable to explain what I mean by specifying some of the *errors* which man has committed, and is constantly committing, in regard to the mental aptitudes of other animals, and by considering the obvious or probable sources of these errors.

1. The artificial differentiation of animal from human intelligence; the ascription of *instinct* as an exclusive posses-

sion to the one and of *reason* to the other; the confusion between instinct and reason; the attribution to instinct in other animals of what would be assigned to reason in man.

2. The belief that animals are mere 'animated machines' (Descartes), and that animal reason is 'mechanical' in its nature or action (Buffon).

3. The confounding of mere reflex or *automatic* action with expressions of pain—for instance, in the decapitated frog.

4. The supposition, on the other hand, that animals are insensible to, or insusceptible of, ordinary physical *pain*—for instance, the rhinoceros and beetle.

5. Baron Cuvier's misstatements as to the mental endowments of, or rather their absence in, *fishes*, while altogether his conceptions on the subject of mind in the lower animals were both limited and incorrect.

6. The inference of Principal Caird of Glasgow—the common outcome of the theological intellect—that the dog, for instance, wants the 'spirit' of man, and cannot therefore 'know the things of man'—whatever such an expression may mean. He speaks of the 'irrational animal that cannot appreciate man's words or acts, that is inapprehensive of man's thought and feeling,' while he admits a certain 'rude intelligence' of its master's will.

7. Kirby talking of the 'half-reasoning' beaver and the 'irrational' animal.

8. The misconceptions, even in physiologists, as to the brain-functions in man (Professor Rutherford).

9. The conviction that the brain is the *sole organ* of mind in man.

10. The association of intelligence, as to its kind or degree, with the mere *size* either of brain or body.

11. The undeserved bad *reputations* of certain animals, and the supposed good ones of certain others; that is to say, misconceptions concerning their *real character*—their virtues on the one hand and their vices on the other—embodied, for instance, in popular emblems, legends, proverbs, fables, or fiction.

12. The inference of the late Sir Benjamin Brodie that

animals live only in the present, which implies that they have no *foresight.*

13. Sydney Smith's opinion that mind in animals exists only for the preservation of the body, or that all their actions bear either on *self-preservation or reproduction.*

14. The ascription of all kinds of mental excitement or forms of insanity in animals to *rabies*—in other words, the non-discrimination of the nature of the different sorts of animal madness.

15. The hue and cry after animals reputedly 'mad,' and their summary destruction when caught.

16. Belief in the incurability and in the dangerousness to man of all forms of animal 'madness.'

17. The idea that rabies occurs only in the so-called dog-days of summer, or during hot weather.

18. The notion that muzzling dogs is a guarantee against the propagation of rabies.

19. The opinion that all *dog-bites* must or may produce *hydrophobia* in man, proceeding as they presumably do from rabid animals.

20. Forcing animals to duties that are not understood by them, that are unpalatable, or that are unsuited to their powers, bodily or mental.

21. Regarding affection for man as a matter of *self-interest* only.

22. Comte talking of the *incapacity for instruction* in apes.

23. *Superstitions* regarding, for instance, the were-wolf, man-tiger, man-hyæna, griffins, dragons, phœnix, salamander, chimæra, fauns, satyrs, naiads, dryads, and hamadryads, witchcraft, and the transmigration of souls.

24. *Inaccuracies* in observation and description by authors of all classes, especially poets, novelists, and theologians, but even by mental philosophers and naturalists of the highest eminence.

25. The comparative but fictitious *exaltation of man* by the degradation or depreciation of other animals; the supposed necessary inferiority of the latter or—what comes to the same thing—the alleged superiority or supremacy of man.

26. The disavowal or non-admission of *man's kinship* to, or fellowship with, other animals; obliviousness of the fact that they are fellow-creatures or fellow-mortals, with fellow-feelings.

27. The perplexing *terminology* of mental philosophy.

Such *errors* as the foregoing are the natural fruit of the following faults and failings of human nature, which have ever constituted, and continue to constitute, formidable obstacles to the proper study of animal reason:—

1. *Ignorance*, on the one hand, of the natural history and habits of the lower animals, and on the other of the natural history of the human mind; or, in other words, of biology, zoology, physiology and psychology (human and comparative), and logic.

2. *Thoughtlessness*; want of due consideration or reflection.

3. *Intolerance*, pride, arrogance, self-complacency or vanity, *amour-propre*, exclusiveness and selfishness, jealousy.

4. *Prejudice*, superstition, bigotry or fanaticism, especially those forms which are theological and metaphysical.

5. *Incompetence* to sift evidence, to observe facts, to reason logically, and the confusion of ideas therefrom resulting.

6. The substitution of *speculation* for the observation of fact and for logical inference. The confusion of the uncertain or unascertained with the certain or ascertained; of fact with fiction, inference, or opinion.

7. *Imperviousness to conviction*, and the prevalence and preference of *dogmatism*, theological or other.

8. *Want of sympathy* with, and appreciation of, animal character, feeling, and suffering.

9. The *dread of the consequences* of scientific enquiry and conclusions, in reference especially to current religious creeds or faiths; fears for the stability or reality of man's boasted pre-eminence, for the vaunted dignity of human nature.

10. The tendency to harsh or *hasty judgments* on the character of subject creatures.

11. The liability to *morbid credulity* or credulousness.

In so far, then, as error, and the sources or causes of error, in or concerning man's conceptions of the nature and

extent of the mental operations of the lower animals are superabundant, it is a self-evident corollary that the student who professes or proposes to devote himself to investigations in comparative psychology should bring to his task at least the following qualifications:—

1. He may have to *unlearn* much that he has already learned—for instance, as regards the supposed necessary connection of mind with *brain or nervous system*—and *unlearning* is always a difficult matter. 'Learn of me,' said Luther, 'how hard it is to *unlearn* the errors which the whole world confirms by its example, and which by long use have become to us as a second nature.'

2. He must be prepared to change, or at least enlarge, his conceptions of the *nature and range of mind.*

3. He should re-study carefully certain phenomena of the human mind, more especially the inter-relations of *consciousness* and unconsciousness, and the whole subject of reflex or *automatic* cerebro-spinal action.

4. He should further consider in detail the mental phenomena of *acephalous* animals or infants; the attributes of the *spinal cord* and of the different classes of *nerves* when disconnected from or unassociated with brain.

5. His study of the human mind must not be confined to its *highest* manifestations or as it has been developed by generations of high culture in the most intelligent of civilised peoples, but it must embrace its *lowest* manifestations—its stages of non-development, non-cultivation, degeneration, retrogression; in all conditions of disease, moreover, as well as in health. Hence his field of enquiry must include man in all the different stages of the social scale, the genesis and progress or development of mind in the infant, civilised and savage, with the morbid psychical phenomena of the idiot and lunatic.

6. He should enquire further whether the bases of mind are not to be found in the *vegetable* kingdom—in the form, for instance, of *purposive action*;[1] what are the bases of mind in plants and the lower animals; what is *consciousness*, and

[1] I have inaugurated enquiry in this direction in a paper mentioned in the Bibliography.

whether it is an indispensable element in mind; and, in short, what is the very essence of *mind* itself.

7. He should be free, or should free himself, from all *bias*, prejudging, preconception or misconception, foregone conclusion, mental preoccupation or prepossession.

8. He should be quite open to *conviction* by the evidence furnished by the observation of facts, ready to confess and renounce his own mistakes either of observation or inference.

9. There must be perfect honesty of purpose and singleness of aim, that purpose or aim being simply the *discovery of truth*.

10. But he must be prepared for the penalties that so frequently attach themselves to the discoverers or propounders of new or unpalatable truths; he must bear in mind that new truths are usually productive of uneasiness, suspicion, or fear in conservative minds, more especially when these truths come into conflict, as they so frequently do, with long-cherished associations or beliefs.

11. He must, however, be *regardless of the consequences* of his discovery or exposition of truth, of his logical generalisations from facts, or of his honest renunciation of error; fearless of the criticism, opposition, vilification—it may be even nowadays, and in one sense or another, persecution—to which his outspokenness may subject him.

12. He should have a natural capacity for, with due training and experience in, careful *observation* and accurate *description*.

13. It is at least desirable that he should be gifted with *fertility in experiment*, with a ready suggestiveness as to the best means of *testing the correctness* of his observations or conclusions.

14. The power of *patient application* to study, and to the study of many collateral branches of a main subject, is equally important.

15. A further mental endowment that may be considered indispensable is *sympathy* both with his subject—comparative psychology—and with the objects of his study—the lower animals themselves.

16. He should be able to discriminate between what man

can and cannot do in the solution of psychological problems; what the student may, or should not, attempt.

17. There should be no confusion with other—probably *irrelevant*—questions or subjects. What the student has to determine for himself is simply this: whether other animals than man, and what animals, exhibit such phenomena as in him are ascribed to, or inseparably associated with, our ideas of *mind*.

18. His *judgment* should be cool and dispassionate, his decisions impartial; the mischievous element *temper* should be eliminated from all possible controversy in which he may find himself involved; and, as a rule, all *controversy* itself is to be avoided, as tending to the introduction of irrelevant and objectionable personalities.

19. In short, his investigation should be conducted on a strictly *scientific* method, and in the true scientific spirit.

Assuming, however, the perfect competency of the student to grapple with his task, there are certain *inherent difficulties* in the subject itself. For instance, it is not at all so easy as may *à priori* appear, in drawing comparisons between the mental phenomena of man and other animals, to make the necessary *allowance for differences in structure and habits*, with which differences in mind and its manifestations are correlated.

Again, we are frequently told of man's incapacity for estimating either the quality or range, nature or comprehensiveness, of animal reason. But this is too obviously a conclusion based on the assumption that animal reason differs essentially from man's. Much has been urged as to the fallacy of reasoning by or from *analogy*; of judging of mind in other animals from the character of that of man. Fortunately, or unfortunately, it is only in this way, by *comparison* with his own ideas, feelings, actions, that man can study the mental or moral endowments of other animals at all; and it appears (to me at least) that this method of study, this mode of forming a judgment—such data for instituting a comparison—lead us to perfectly trustworthy results, assuming always that the student possesses the qualifications for such an enquiry that have been already specified.

In an investigation in which comparison is constantly being made between the *human* and animal mind, it is all-important that man's standard, ideal, or type of the human mind should not be too high. It is much safer and sounder to form his ideal or average from the mental condition or phenomena of the *lowest* races and most degraded classes of man, than from those of the highly cultured Englishman or American, German or Frenchman.

Much has been made, by those who deny that animals possess mind at all, of the ever-present danger of confounding *resemblance* with identity; and I do not desire to conceal or depreciate the magnitude or frequency of occurrence of such pitfalls for the unwary. But the fact that the existence of such difficulties or dangers is admitted by all parties—those who affirm, as well as those who deny, the possession by the lower animals of mind of the same nature as that of man—merely indicates the desirability of the possession by the student of comparative psychology of the special qualifications before enumerated.

No doubt we can only make *guesses* or conjectures at the truth; we can attain but probabilities as to the presence or absence in the lower animals, under certain circumstances, of such faculties as *consciousness*. The difficulties of anything approaching *proof* or demonstration are sometimes insuperable; but these difficulties are equally great in regard to the analysis of the mental condition of countless thousands of *human* beings, in whose case at least it cannot be affirmed that *analogical* study is not admissible or appropriate.

The practice of mental *analysis* is indispensable to the student, who has only patiently to reflect upon the mental qualities involved, for instance, in some of the commonest tricks or feats of performing or other animals, to become convinced of the *number, nature, and variety* of their psychical aptitudes or gifts.

CHAPTER II.

FAULTS AND FANCIES OF TERMINOLOGY.

MAN has probably from time immemorial been in the habit of using towards his brother man abusive or opprobrious epithets based on the supposed evil qualities and mental inferiority or difference of the lower animals. These *terms of contempt* or abuse—of invidious comparison—embody and illustrate many current popular errors and prejudices regarding the mental endowments of animals, or the absence of such endowments. They libel animal intelligence and virtues, while they do no credit to those of man. Ignorant, selfish, proud, prejudiced man takes very much in vain the names of many estimable animals and animal virtues in such designations as the following:—

1. *Brute*; 'brutal' or 'brutish,' 'brutality.' In so far as these words have become synonyms for want of feeling or affection, for savageness, for cruelty and the love thereof for its own sake; or for animals that are stupid, coarse, or unrefined, irrational, impulsive, swayed by the lower propensities, mentally degraded, devoid of moral sense, conscience, the religious sentiment, or even of reason (according to the dictionaries)—such terms are much more appropriate to man himself than to the lower animals; while, in so far as they are truly applicable to the latter, the propensities which man calls distinctively, but most erroneously, unjustly, and ungenerously, 'brutal' have been, in the majority of instances at least, produced by man's own bad example or training, or both—in short, by his own evil influence upon them, designed or unintentional.

2. *Bestial*, in so far as it is used synonymously with

'brutal' in its bad sense. In the sense in which it is simply equivalent to 'animal' its use is quite legitimate, as when psycho-pathologists talk of 'bestial' insanity in man. A man who is found in the gutter hopelessly drunk is said to have 'made a *beast* of himself;' and the coarse, rude, vulgar man is frequently said to 'behave like a beast.' Unfortunately there is a converse. Intoxication is one of the vices common to other animals with man—one of those, moreover, that they adopt by imitation from man. When, therefore, an unfortunate monkey, dog, or horse, ant or medusa, is inebriated, if the term 'behaving like a beast'—as one of opprobrium—is applicable at all, it is so to the man who is the cause, direct or indirect, of the animal's intoxication. Illustrations will be found in the chapter on alcoholic and other forms of 'intoxication' in animals.

3. *Animal*, in so far as it is used distinctively — implying a distinction, structural or psychical—between man and other animals; for man himself is but an 'animal,' and frequently very far from being either morally or intellectually the highest. The word 'animal' is both faulty and objectionable when applied—as it so commonly is by phrenologists—to feelings or faculties, organs, constitution, or nature in man in contrast with those other mental qualities which are described as moral and intellectual. Thus it is used as synonymous with sensual, sexual, unintellectual, when we speak of an 'animalised' man, or of a man as 'a mere animal,' or apply the term 'animality' to man's lower propensities in contradistinction to his 'humanity,' his moral and intellectual nature; but in all the senses in which it is so variously used it is at least quite as applicable to man as to other animals.

4. It is both an insult to the animals in question and an error in comparison to speak of conjugal or domestic jars as significant of a 'cat and dog life;' the fact being that cats and dogs frequently live—as do also many other animals, even of different genera and species—in the utmost *harmony*. If this harmony be not the result of natural conditions—if the animals in question do not contract natural companionship and interchange a natural affection and

regard—they can at least be trained into so desirable a condition of affairs.

5. It is even a greater indignity to offer to the noblest of all the lower animals to describe a contemptible person as 'a dog,' 'a dirty dog,' 'an ugly dog,' or 'a sly dog;' to refer to a human dandy as 'a puppy,' or to a mean, shabby human scoundrel as 'a hound;' though it may be legitimate enough to characterise a chattel as 'dog cheap.'

6. The word *cannibalism* is derived from *canis* (a dog), or at least is said by the dictionaries to be so. But the practice of destroying each other or their young, for the purpose of eating their victims or not, is quite as common in man as in any of the lower animals; and there is no good ground why the dog's generic name should be selected in the nomenclature of so horrible a procedure or practice.

7. 'A dog in the manger' spirit is said to be possessed by a man who neither will nor can use a thing himself, nor allow the use or enjoyment of it to those who have both the will and the ability to employ it to good purpose; but in point of fact a dog in his manger frequently gives his protection to, and shares even his food with, companions of very different genera and species.

8. 'Give a dog a bad name, and you may as well hang him,' is literally applicable to unfortunate animals suspected of rabies. Whatever may be the case with men, to whom the phrase is applied figuratively, the dog to which this particular kind of bad name is given is usually wholly undeserving of it, and if properly treated would prove itself in nine cases out of ten to be a harmless, respectable animal.

9. We apply the words 'an old cat,' or 'spiteful as a cat,' to backbiting scandal and all manner of spitefulness; and no doubt the cat is occasionally spiteful, or may be supposed to be so; but it is not distinctively so, and it is far less so than many men, and especially women, while the poor cat has many admirable qualities for the possession of which it gets no credit.

10. We say of a consequential, pompous, empty-headed coxcomb that he is 'proud or vain as a peacock;' but the

pride or vanity is much more certain in the case of the man than in that of the beautiful bird.

11. We call a man 'a bear' in allusion to his roughness or gruffness—his tone, temper, or manner—forgetting that the bear is both an affectionate and intelligent mother.

12. One schoolboy calls another who is, or is supposed to be, cowardly 'a hen;' but the hen—in its condition of maternity at least, in protection of its brood—is capable of the exhibition of wonderful bravery.

13. Alluding to the alleged hopeless stupidity of another, a boy stigmatises his companion as 'an ass' or 'a goose.' But here again the poor animals are grossly maligned; for both of them, under favourable circumstances, sometimes exhibit great intelligence.

14. The ass, too, is regarded as the emblem of obstinacy and laziness; but in its natural or wild state, or under proper treatment by man, it is neither an obstinate nor a lazy animal. Its vices, when it possesses them, it owes usually to man; so that in this as in so many other similar cases the misjudged animals have had developed in them, by man's inhumanity, vices that are really more properly human.

15. A timid child is described as 'a sheep;' and no doubt the domesticated sheep is an eminently timid animal; but, on the other hand, the males of certain races, breeds, or species of wild sheep are both courageous and intelligent.

It were easy to multiply such instances of man's injustice and ignorance; but it is unnecessary to illustrate this subject further here, seeing especially that it is again treated of in the chapter on animal reputation.

Some of man's phrases that appear on the surface *uncomplimentary* to other animals, because they are obviously intended to be so by those who employ them, are really in a sense complimentary. For instance, when one man is spoken of as 'dogging the steps' of another, an unintended tribute is really paid to the fidelity in companionship, to the disinterestedness in servitude, of the dog. The dogging of footsteps by fellow-man is applied to close following for a sinister object, whereas in the dog's faithful following of his

master no sinister object can possibly, as a rule, be suspected.

Man commits equal error in the epithets applied to his brother man which are, or are supposed to be, *complimentary* to animal virtues. For instance—

1. When we say 'brave as a lion' we commit a grave error; for the lion, so far from being a brave, is naturally a cowardly animal.

2. The majesty of the eagle is also very much—so far as the term relates at least to mental qualities—a fiction of the poet and the public.

Equal *error*, then, is committed by man in regarding animals as *emblems* or embodiments of human virtues or vices, a subject that is further discussed in another chapter (on animal reputation).

Other illustrations of an incorrect and *objectionable phraseology* are to be found in such terms as—

1. *Dumb*, or mute, as applied to the lower animals, implying inability, by a supposed want of all language, to make their wants or feelings known to man or to each other. This is one of those numerous mistakes attributable to man's ignorance, the fact being that animal *language* is quite as eloquent and efficient in the eyes of those who have studied, and consequently understand, it as can be the mere spoken or written language of vain man.

2. *Lower*, as applied to other animals than man. No doubt, on the whole or as a group, other animals are zoologically, and psychically, as well as structurally, lower than man. But it is not true that all animals are necessarily lower psychically than all men; for the converse is true, that many individual animals—dogs, horses, elephants, parrots—are both morally and intellectually *higher* than thousands of men even in the very centres of Western and modern civilisation.

3. *Raving*, as applied to the delirium or mania of animals incapable of speech. There are, however, exceptional cases, in which the use of such a term is not only not so absurd as may at first sight appear, but is quite legitimate—for instance, in the case of parrots able to speak, sometimes in more than one human language.

4. *Hydrophobia* is an instance both of the unnecessary multiplication of technical terms and of their ambiguity. It is most unnecessarily and mischievously applied to man in contradistinction to *rabies* in other animals, while the term 'hydrophobia' itself is highly objectionable, as based upon a mere symptom that frequently or generally does not exist, and that is at least non-diagnostic.

5. *Madness* in animals may mean any one of several very different affections, including especially insanity and rabies. Rabies itself is sometimes spoken of as 'distemper madness' (Philpots), making 'confusion worse confounded.' A very common and a very serious mistake of a city populace is to confound mere excitement in the hunted, terrified dog or ox with rabies or madness. The animal that is simply overdriven, houseless, starving, nervous, and timid, becomes excited under the influence of man's foolish hue and cry, and naturally takes to flight, endeavouring, and sensibly, to escape from its tormentors. The 'fury,' 'furiosity,' 'infuriation,' 'ferocity,' or so forth that is occasionally developed, with its accompanying or resultant danger to human life, is simply and entirely due, in the majority of cases, to man's own stupidity and inhumanity.

6. The popular terminology of *insanity* in the lower animals includes such vague terms as 'frenzy' and 'franticness.'

The current *terminology* of mental philosophy abounds in sources of perplexity to the student. He has perpetually to encounter the *misuse* of certain terms; the *inexactness* and multiplicity of the applications of others, even by professed naturalists; the variety and contrariety of *definitions*; the impossibility of defining some; the employment of others sometimes in a vague, *popular*, comprehensive sense on the one hand, and in a strictly *scientific* sense on the other. The following are instructive illustrations of some of these difficulties or sources of difficulty:—

1. As has already been shown, and as will appear in the sequel, the all-important term and quality *consciousness* may be used, as it is throughout this work, in its ordinary, popular, vague, and comprehensive sense as applicable in different degrees to man, the lower animals, and possibly

even to plants; or its definition may be so restricted by metaphysicians as to be applicable only to man.

2. *Sense* and *sensation*, *sensibility* and *sensitiveness*, are constantly confounded. Thus the late Dr. Baird, of the British Museum, used the term 'sensibility,' instead of 'sensitiveness' or 'susceptibility,' in speaking of the effects of weather changes on animals.

3. *Irritability* is frequently used by physiologists, in a strictly scientific sense, as synonymous with mere sensitiveness to the influence of a stimulus—that is, with mere irrito- or excito-contractility as it exists even in plants—while the general public understand by it irascibility (of temper), and the physician frequently a certain morbid state of brain and nervous system.

The faulty or unsatisfactory character of current *definitions* of metaphysical terms is freely admitted by metaphysicians themselves. The extreme difficulties of the definition or application of the terms used in modern mental philosophy have been pointed out by authors differing so much in their various points of view as Darwin, Lewes, Laycock, and Bain. Lewes, for instance, refers to the 'deplorable and inevitable *ambiguity* of communication resulting from an absence of strictly defined technical terms' as constituting one of the 'many difficulties which lie in the way of psychological investigation.' On the other hand, Guizot has remarked that 'the *common meaning* of a word is much more correct than the scientific meaning, which has been given by a few persons under the influence of a particular fact that has taken possession of the imagination.' Hence the propriety, as it appears to me, of avoiding, when possible, in such a work as the present all strictly metaphysical terms, or at least of avoiding, where they must be introduced, all pedantic definitions thereof, and of employing such popular designations as *mind*, *reason*, *intellect*, *instinct*, *consciousness*, and so forth in their *ordinary*, albeit vague and comprehensive, acceptations.

CHAPTER III.

AUTHENTICITY OF ANECDOTES OF ANIMAL SAGACITY.

It must be obvious—it requires no argument surely to show—that anecdotes of animal 'instinct' or intelligence are only of value—they can be used as the basis of sound inferences, conclusions, or generalisations, only if or when they are true or authentic, or can be relied upon as representations of actual facts. To be of service there must be no doubt of their truthfulness.

Unfortunately, however, even of the endless volumes of such anecdotes that have been published in our own language and in our own country, a large proportion is valueless for the purposes of science, because we are furnished with no proper guarantee that the incidents as described actually occurred. Either the names of the observers or recorders are not given, or they are those of unknown persons, for whose veracity—of whose capacity for observing, narrating, or describing accurately even the simplest facts—we have no sort of voucher. In other cases the narrative is clothed in the garb of fiction, or there is a certain amount of poetical or sensational amplification, so as to make the record read like a 'story;' and though perhaps in all, and no doubt at least in many, cases the fiction has been founded on fact, it is impossible to distinguish the one from the other.

This being the case, I have set aside in my own enquiries all anecdotes that did not bear, or appear to bear, the stamp of truthfulness or authenticity either in their authorship or in the incidents themselves, or in both. I have been led to prefer for my data modern or recent incidents, described for the most part by living persons of acknowledged com-

petency, and to disregard all anecdotes that have been transmitted, sometimes in many versions, from classical or mediæval times. Many of the anecdotes on which I have based my own conclusions regarding the mental status of animals were described to me by eye-witnesses of the incidents, in the truthfulness of which witnesses I could put implicit trust.

On the other hand, in the Bibliography will be found the names and characters of works and authors from whom much of my material for generalisation has been drawn. For all incidents that are not of the most ordinary kind, capable of observation by anybody and anywhere, as well as for all conclusions at variance with my own, I cite the name of my authority.

The authentication of anecdotes that are not of the most ordinary kind, the proof of the truth of the incidents their observers describe, the determination of the accuracy of their narrators, is always desirable and generally practicable. I have therefore been at considerable pains, when the possible or probable result promised to be worth the effort, to ascertain whether certain statements—illustrative, for instance, of animal sagacity or ingenuity—made by *anonymous* writers in books, magazines, or newspapers, were correct representations of actual facts.[1]

I have repeatedly applied or appealed to editors or publishers, sometimes with a satisfactory, at other times with a reverse, result. That is to say, that on the one hand either the said editors or publishers assured me of the veracity and *bona fides* of their contributors or authors, giving me their names and addresses, or these contributors or authors themselves have in writing acknowledged their authorship of the anecdotes which formed the subject of enquiry, and vouched for the *reality* of all the facts as narrated, generally as having been observed by themselves.

In other cases editors or publishers have frankly admitted that their contributors were not men of any weight, scientific or literary—not persons to be trusted; in short, that they

[1] Specimens of these enquiries and their results are given in a series of papers mentioned in the Bibliography.

were literary hacks or compilers, probably unwilling, if not also unable, in the haste of writing what are vulgarly known as 'pot-boiler' books or articles, to observe for themselves, or even to collect information at first hand. Such penny-a-liners were as likely as not to take their material from forgotten, oldish works, whether such works were of repute or not being a consideration of no moment, and to serve up in some new, *ad captandum* form hackneyed stories of a sensational kind to meet the public demand for what is called 'popular science.'

Like the famous razors of the razor-grinder, that were made to sell and not to shave, or the equally celebrated wooden nutmegs of the Yankee pedlar, that were intended to captivate and deceive the eye, not to gratify the palate—the anecdotes of this class of penny-a-liners are 'got up' merely to suit the wants and pander to the ignorance of a non-discriminating market.

It seems to me desirable to indicate some of the results of my own enquiries as to the authenticity of anecdotes. The writer of the description of a certain 'talking bird' (a grey parrot) in 'Chambers's Journal'[1] thinks it necessary to preface the account of his 'interviewing' of the animal for journalistic purposes with the following explanatory remarks:—'A bird so very remarkable for its powers of speech is about to be described, that it will be well to premise that the sketch to be offered is *perfectly true*, not the least a fiction.'

In order to give the reader opportunity of judging for himself as to the existence of the parrot and the reality of its wonderful mental feats, the author of the article published the name and address of the owner of the animal—a well-known photographer in Edinburgh, in whose town or country abode it may probably still be seen.[2] 'I am grateful,' says the author, 'for his [the photographer's] kindness in authorising me to make this statement, because it will save me from being suspected of *inventing*

[1] For October 31, 1874.

[2] Since this was written I have heard of its death, in November 1876.

the story.' The circumstantial details were such as to enable me to investigate the matter for myself.

I had no opportunity of doing so till August 1875, when, being in Edinburgh for a few days, I called upon the photographer referred to for the purpose of seeing his parrot, and of hearing for myself the character of its 'speech.' With Mr. Truefitt himself I had a long interview; saw photographs of the animal, and heard many anecdotes illustrating its intelligence. Among other information he gave me the name of the writer of the article in 'Chambers's Journal,' who proved to be an English clergyman. The parrot itself was in the country—at Cramond, near Edinburgh—in charge of Mr. Truefitt's mother, who was more fully acquainted with all her pet animal's peculiarities, in consequence of the closer intimacy of her association with it, than any other member of her family.

My object not having been gained by a mere conversation with Mr. Truefitt, I devoted a day to a pilgrimage to Cramond. There I saw the bird, and had the benefit of a long interview with its mistress. The result of all which enquiries was that, though I saw the bird to disadvantage—after an illness and just before dinner, when it is always indisposed to conversation—I was convinced of the truthfulness of all the statements regarding it; for instance, those which illustrate its *appropriateness of remark.* It so happened that about the same time Edinburgh was visited by a troupe of performing dogs, whose feats were made the subject of exhibition at one of the theatres. The newspaper reports of course bepraised those feats as something marvellous. I therefore devoted an evening to attend at the said exhibition; and here again I was left in no doubt as to the genuineness of the proofs of intelligence called forth by proper training. The occasional *mistakes* of the animals—dogs of different breeds—were quite as instructive as their more successful performances, showing, as both did, the operation of an intelligence quite comparable to man's.

Seeing especially that I have entered more fully on this subject elsewhere, I cannot occupy space here with further examples of the results of my efforts to establish the authen-

ticity, or the reverse, of published assertions regarding animal sagacity. Suffice it that the following are *inter alia* illustrations—to be found in the Bibliography—of *anonymous* magazine articles, having all the aspect of fiction, which proved to be in all respects *true*—viz. 'The Consciousness of Dogs,' 'Dogs whom I have known,' and 'An Ugly Dog.' In the Bibliography, however, they do not appear as anonymous, but are enumerated under the names of their respective authors—Cobbe and Murray.

There are certain common sources of information concerning animal habits on which it may be desirable to make some remarks. I have myself derived much information from children, school-girls, young ladies, elderly ladies, farmers' wives, and other ladies who, with no bias or prejudice, no theories or speculations to support or to disturb them, told truthfully what they were in the habit of observing in their own home pets or household retainers; and these pets or retainers included a very considerable variety of animal genera and species. The facts so observed and described were those common facts that are capable of verification by anybody of ordinary intelligence—those common facts upon which alone may be based a sound scientific knowledge of the nature and range of animal mind.

I have also derived much assistance in the collection of data from *newspapers*. It is scarcely possible to take up one of the best class that does not contain some reference, direct or indirect, to animal habits in the form of anecdotes of animal intelligence. Not only do newspapers give local incidents, with the dates of their occurrence and the names and addresses of the observers, so that the facts narrated may be investigated by any enquirer, but the exigencies or customs of the fourth estate nowadays lead newspaper editors to draw largely for quotation and review upon serial and book literature. They furnish, in truth, a *résumé* of all that is going on in the literary or scientific world by quotations from, and reviews of, magazines and works of every kind —including those relating to zoology and general natural history.

Attention is thus drawn to anecdotes and illustrations

of animal intelligence that would otherwise escape notice. Contrasting current newspapers as repertories of reference with volumes of anecdotes of animal instinct, I have found the former to be more valuable and trustworthy, inasmuch as *inter alia* newspapers usually refer to passing events, the records of which admit of investigation, and the authenticity of which records can at once be established or the reverse. I have had frequent occasion to enquire into the truthfulness or accuracy of newspaper paragraphs—of the reports of local 'correspondents'—relating to singular instances of animal intelligence; and the result has usually been that, while I have found the same incident sometimes differently described in half a dozen different newspapers, all the *essential facts* have been given accurately, or the dates and names furnished enabled me to discover the actual and important facts for myself.

Much attention is now being given to the subject of animal intelligence in all classes of our *serials*, whose number, scientific and literary, is simply legion. The articles which illustrate or discuss the subject in question are not always anonymous. For instance, in 'Nature,' as in 'Science Gossip,' the name of the author is frequently or usually appended, so that the value of his statements or opinions may be judged of by the admitted or doubtful competency of the observer or narrator. But even where the articles are *anonymous*, as in 'Land and Water' or the 'Field,' in the various London or other quarterlies or monthlies, it is usually possible, sometimes easy, to discover the author's name, and to gauge the veracity and value of his assertions; and we have the additional guarantee, in many if not most of these serials, that the editors may be trusted to admit no contributions from authors who are not competent to deal with the subjects they respectively discuss.

A common and instructive feature nowadays of all classes of serials, including newspapers, is their practice of reviewing works of natural history, zoology, and travel by competent critics, whose comments are frequently as valuable as the quoted observations of the authors criticised. The modern practice of publishing volumes of *reprints* of articles that

have originally appeared anonymously as contributions to the serial press gives us occasional opportunity of discovering the names, and consequent competency, of the said anonymous writers as observers and recorders of facts in natural history.

But even when the author of anecdotes of animal feeling and sagacity gives his name to the public as a voucher for their authenticity, fact may be clothed in such a garb that it has all the semblance of beautiful *fiction*, and as such an imaginative public prefers to regard and accept it. I very well remember, when in Edinburgh some years ago, and in conversation on the subject of animal reason with a lady of much shrewdness both in observation and inference, a relative of my own, who had, like so many of her countrywomen, been much moved by Dr. John Brown's well-known story of 'Rab and his Friends,' that she cast a doubt on its truthfulness, regarding it as a 'story,' and a mere story, and thinking all the more highly of it on that account. I had myself no reason to doubt that the story was fact, or founded on fact. But calling on the author himself, and discussing the subject of the apparent incredibility of real enough occurrences illustrative of animal intelligence, I took the opportunity of putting the question to him personally and directly whether or not 'Rab' was a fact, and behaved as he is said to have done. The answer was what I had expected—that it was all 'perfectly true.'

And this leads me on to remark that the student of anecdotes of animal sagacity will constantly find that

> *Truth* is strange—
> Stranger than fiction ;

that incidents which appear simply incredible, and which are relegated to the category of *fable* or romance, on investigation prove to be, like Dr. John Brown's 'Rab,' 'perfectly true.' A distinguished author, well known as a canophilist, told me some years ago that he dared not publish certain anecdotes or incidents illustrating the remarkable intelligence of dogs and birds under exceptional circumstances, though he believed them to be 'perfectly true,' just because they would not be believed by the public. They would have

been regarded either as pure fictions or as gross exaggerations of the truth; and in either case his position—his reputation—as the describer of other incidents that were only equally true, but for which he could better vouch from direct personal knowledge, would have been weakened or imperilled.

The category of the apparently *incredible* in anecdote is well illustrated by what used to be called 'travellers' tales.' The suspected veracity of such tales, and of those who made them public, is notorious. But it has been proved by modern travellers over and over again that stories long regarded as fabulous are, or have been, *simple facts*—for instance, those of Bruce as regards Abyssinia, of Du Chaillu as regards Western Tropical Africa, of Livingstone as to Central Tropical Africa, and of Humboldt and Waterton as to South Tropical America. The history of the gorilla affords a striking instance of the confirmation of old travellers' stories by the researches of modern missionaries—for instance, those of Dr. Savage, the American missionary, in 1847. Purchas, in 1613, on the authority of an Englishman—Andrew Battel, who had lived for some years in Congo—described what he called 'pongoes,' asserting *inter alia* that they 'build shelters for the raine . . . . and cover the dead with great heaps of boughs and wood. . . . One of these pongoes took a negro boy of his, which lived a month with them.' In point of fact, the evidence of modern traveller-naturalists is of the most important kind. I allude to such men as Humboldt, Agassiz, Darwin, Wallace, Houzeau, Bates, Belt, Hooker, Audubon, Wilson, Gould, Gillmore, and a host of others, who, with competent natural history knowledge and the desirable natural history tastes, had the inestimable advantage of *foreign travel*—more or less extensive—and who have made the best use of their opportunities of observation by placing on record all that they saw noteworthy in animal habits.

Nor are we to regard 'old stories' as fabulous simply because of their *age*. Though I have, for the reasons already specified, preferred *modern* to ancient anecdotes or illustrations of animal intelligence as the basis of my own

generalisations, it is only just to the naturalists of classical times—of ancient Greece and Rome, for example—to point out that one of the results of modern research has been to prove the correctness of observers and recorders who lived centuries before accurate observation or philosophical inference is supposed to have existed or to have been developed in the progress of Western civilisation. In certain cases the observations of Aristotle, Herodotus, and Pliny have been laughed and sneered at as incorrect, fanciful, poetical, or mythical, by successive generations of more modern naturalists among the scientific and 'advanced' nations of the West.

Nevertheless, the most recent researches sometimes prove the *accuracy* of the distinguished Pagan, and the inaccuracy of the less distinguished Christian, naturalists. One of the most remarkable instances of this confirmation of the soundness of the observation and inference of ancient naturalists is the corroboration by the late Mr. Moggridge, at Mentone, in the South of France, of the observations made on harvesting ants by Aristotle hundreds of years ago. Mr. Lee's observations at the Brighton Aquarium on the reproduction of the *octopus* also confirm those of the noble Greek naturalist and philosopher Aristotle. Countenance at least is given to the well-known ancient fable of Romulus and Remus by the discovery in India, in recent times, of so-called 'wolf children,' who, whether or not they have been suckled or protected by wolves, have many of the habits of those or other wild animals, as is fully pointed out in another chapter.[1] Much ridicule, again, has been expended upon the assertion —repeatedly made, and by generations of naturalists—as to the 'milking' of *Aphides* and other insects by ants. That it is nevertheless a fact, that certain bees do the same, and that *Aphides* are by no means the only insects treated as milk kine, has been shown in the pages of 'Nature' quite recently by observers so competent as Fritz Müller and Meldola.

On the other hand, there are many stories in modern

[1] That which treats of the degeneracy or defective development of the human mind.

fiction that are types or representations of real incidents or character—are borrowed or transferred from actual life—are taken or copied from nature. Exact representations of the finer as well as the coarser traits in animal character, particularly as relates to the dog and horse, occur abundantly in the works both of novelists and poets—including, for instance, those of Sir Walter Scott, Burns, Byron, Cowper, Bulwer (Lord Lytton), and George Eliot. Such anecdotes, however, are apt to be looked upon not as genuine illustrations of animal character, feeling, or intelligence just because they do occur in poetry or fiction. Nor is it easy, in such cases, to distinguish the *fiction* from the fact; the more so because of the inexact or erroneous representations of animal mind given by other poets and novelists, including Shakespeare and Rogers. In this category—of writers who are too imaginative to be depended upon, who are untrustworthy as to their facts, who are figurative, fanciful, and sensational, rather than accurate, in their descriptions of animal habits—must be included certain French and other so-called 'popularisers' of science, such as Michelet and Figuier.

But the difficulty of discriminating between fact and fiction—of accepting facts as such, because to the ignorant they appear to be improbabilities—is daily being illustrated in many other ways. For instance, there are many worthy people—living at a distance from the scene of the incident, in whose case distance obviously lends enchantment or romance to their view of a perfectly prosaic subject—who believe the whole of the well-known story of 'Greyfriars Bobby' to be fiction, and who ascribe the dog's memorial collar, monument, and other civic or private honours to the tendency of imaginative men and women to idolise their ideals of animal virtue. They regard the old dog of the Greyfriars churchyard, Edinburgh—long so familiar to the dwellers in the precincts—as a mere myth, the poetical embodiment, however, of the human ideal of canine fidelity and affection. On the other hand, people living in Edinburgh itself, and having confidence in the observers and recorders of the facts of Greyfriars Bobby's life, are convinced of the former existence of the animal, and of the truthfulness of

the narratives that record his attachment to his master's grave. They accept the story, as usually given, in all its essentials; and they are correct in so doing. Again, the discussion recently carried on by Pouchet and other authors —as recorded in the 'Animal World'—as to hedgehogs spiking apples with their quills shows that there is the greatest possible difficulty sometimes in ascertaining the *exact truth* in current stories about common animals. Assertions on the one hand are controverted, or their facts denied on the other—the authors of both assertion and denial being, perhaps, equally reputable writers.

It has to be explained, lastly, that the value of *anecdotes* is apt to be greatly over-estimated. Apart altogether from the fact, already pointed out, that every man, woman, or child may speedily observe a sufficient number of facts upon which to base safe and sound conclusions as to the nature of animal 'instinct,' a few common, well-authenticated incidents are sufficient for the same purpose—quite as valuable as a larger number, and infinitely more valuable than a host of anecdotes unsupported by proper evidence of their authenticity. For this and other reasons I have deemed it both unnecessary and undesirable to crowd these pages with any profusion of illustrative anecdotes or quotations, which would have the disadvantage of confusing the reader and distracting his attention, as well as of occupying space that is devoted, it is hoped, to better purpose.

CHAPTER IV.

STUDY BY OBSERVATION AND EXPERIMENT.

By far the best way to acquaint oneself with the phenomena of mind in the lower animals is by the *personal observation of animal habits.* I can conceive no one so unfortunately placed as not to have opportunity of observing the behaviour of such animals as the horse, dog, cattle, sheep, or poultry, or the domestic pets, such as the cat or canary. Even blindness has not proved a barrier to observation and experiment of the most valuable kind; for Francois Huber, the famous Swiss naturalist, distinguished for his researches on bees (in which he was able to expose the errors of predecessors, who did not labour under his physical disability), was blind. Nor is poverty an obstacle to observation and enquiry;[1] for there are, perhaps, no more sincere lovers of animals, of home pets, no keener observers of animal character, than the poor, who make real companions of their dogs, cats, and canaries, of their horses, donkeys, and pigs. The obstacles to personal observation are, therefore, merely nominal and visionary. In truth, 'where there's a will there's a way.'

The faculty of observation, however, requires to be cultivated or trained. The eye must be trained to the accurate notice of phenomena; the memory to the recollection of facts; the judgment to the drawing of logical inferences from facts. There has been much *false observation* and much false or incorrect record of facts, much false reasoning on these false facts, on the subject of what has hitherto been known as

[1] As is well illustrated in Smiles's 'Life of a Scottish Naturalist'—Thomas Edwards, the poor journeyman shoemaker of Banff.

'instinct' in animals. Instances of *faulty observation*, even by naturalists, are to be found in the different accounts that have been given of the habits of harvesting ants, and of the uses of its tail by the beaver. Those who are most intimately associated with the lower animals frequently fail to notice their mental peculiarities from want of the proper training of their observative and reflective powers; while they commit numerous errors of interpretation or inference from ignorance, prejudice, superstition, or the other faults specified in the chapter which treats of the proper 'method of enquiry' concerning the character of mind in the lower animals. Thus the most important information that has been derived or contributed on the subject of mind in the lower animals has not come from veterinarians, sportsmen, jockeys, cattle dealers, drovers, shepherds, butchers, grooms, or ostlers, but from naturalists, accustomed to the accurate observation of natural phenomena and to a proper appreciation of the value of the facts of observation. Illustrations of exact and conscientious observation, and record of facts or observations, are to be found in the writings of Charles Darwin, Houzeau, Wallace, Belt, Moggridge, Spalding, Ferrier, the Hubers, Fleeson, and many other authors, whose names are generally mentioned in these pages, or specially in the appended Bibliography. There is, perhaps, no better example to all than Audubon's study of bird habits in the forests of North America.

All that is necessary to an understanding of the nature and range of animal reason is a study of the commonest facts of observation—those which are capable of the easiest daily verification in the horse, dog, cat, canary, and other domestic animals, in almost every country under the sun. If once established or fixed by common experience, such facts can neither be overthrown nor explained away. *Facts*, however, must ever be carefully distinguished from *inferences, or opinions* based upon them, which may vary *ad infinitum*. The Rev. Gilbert White, of Selborne, has shown how fertile a field of observation may exist in a limited rural locality; and, in fact, a field of observation, more or less fertile, is to be found in every farm-yard,

kennel, stable, byre, or market; while it may be produced in every homestead, even in every apartment of every man's dwelling.

No doubt there are certain subjects deserving of observation that are not open to everybody, that can, on the contrary, be fitly studied by a very few persons, and these highly qualified naturalists—for instance, the mental endowments or aptitudes of the anthropoid apes. To certain classes only of the population, again, the following special fields or facilities for observation are at command:—

1. Zoological gardens.
2. Menageries.
3. Annual or periodical animal shows, such as those now so common in London and elsewhere, of horses, cattle, dogs, cats, donkeys, poultry, pigeons, and song birds—the animals exhibited belonging for the most part to the same species.
4. 'Happy families'—another form of peripatetic popular animal show, in which different genera and species (frequently hereditary or natural enemies) are exhibited in harmonious groups; such as monkeys, dogs, cats, rats, mice, and owls.
5. Aquaria, marine and fresh-water.
6. Apiaria, vespiaria, and formicaria of all kinds.
7. Aviaries, dovecots, rookeries, and swanneries.

Zoological gardens, and more especially travelling *menageries*, offer the means of studying, for instance, the effects of confinement and artificial existence on animals accustomed to a free, active forest or campaign life in warmer climates—including the diseases, mental and bodily, that are created or aggravated by such a change in the conditions of being; the alteration of instincts or habits, of character or disposition—with circumstances—including the development of *new* instincts or habits, the loss of *old* ones, and the substitution of vices for virtues, and *vice versâ*. They offer also great opportunities—not hitherto utilised—for the systematic study of the *range of mind* in the various classes of animals in the ascending or descending zoological scale. Animal shows or exhibitions are both the causes and effects

of an improved public feeling towards subject creatures; besides which, they have a distinct scientific and educational value. Dr. Dohrn, of Naples, Mr. Lloyd, of the Crystal Palace Aquarium, and Mr. Kent, of the Aquaria of Brighton and Manchester, have shown the value of marine and other aquaria in the study of the habits of fish and other aquatic animals. *Happy families* are most instructive and suggestive as showing man's power for good or evil over other animals, the force of discipline, their capacity for education, and their power of control of their natural propensities or passions.

Not only, however, is it possible for every man, woman, and child of average intelligence to observe and reflect upon the habits of domestic and other animals, and the nature of the phenomena which they exhibit or involve, but *experiment* may equally fitly and easily be instituted in order to determine the true nature, relations, and range of their so-called 'instinct.' In order to show what has been already done in this direction, and what may still be accomplished by those who have the necessary qualifications, I append a list of the chief, including the most recent, experiments on the mental endowments of animals that have come under my own notice.

1. *Moggridge*: on the ants of the south of France, including his interesting observations on 'harvesting ants;' the possibility of deceiving them by beads instead of grain; deterring or alarming them by the sight of a mere line, or of dead or dying companions.

2. *Lubbock*: on ants, bees, and wasps; their power of intercommunication, of way-finding; their perception of colour and sound; the influence upon them of light, of alcohol, of chloroform; their tempers, affection, and intelligence.

3. *Belt*: on the foraging and leaf-cutting ants of Nicaragua, and on the artificial production by corrosive sublimate of insanity in the whitefaced monkey.

4. *Hague*: on the ants of California.

5. *Huber* (Pierre): on ants in formicaria, and on caterpillars.

6. *Huber* (François): on bees; changes in the mode of building their combs, the result of unforeseen physical obstacles; their mode of dealing with pieces of loose comb; the effects of killing the queen.

7. *Latreille*, *Nemour*, and other authors: on ants.

8. The celebrated American author Dr. *Franklin*: on ants with the treacle pot.

9. *Pasley*: on scorpions; their power of self-stinging and suicide.

10. *Boyer*: on crickets; the effects of sound.

11. *Spalding*: on birds; the nature of instinct in newborn chicks.

12. *Houzeau*: on horses and dogs; their understanding of man's words and conversation, on speaking to or addressing them as he would have spoken to or addressed children; their knowledge of time.

13. *Nichols*: on dogs and horses; railway travel in relation to knowledge of time, the succession of events or eventuality, the calculation of the number of stoppages; their use of natural tools.

14. *Menault*: on dogs, testing their power of understanding man's conversation.

15. *Leroy*: on omnibus mules, and on crows; their ideas of number and time, of duty and relaxation therefrom.

16. *Burnett*, *Jebb*, and others: on the dog, horse, and cat; their power of way-finding.

17. *Fleming*: on the pig; the effect of white colours.

18. *Ferrier*: on monkeys and other animals; the localisation of the functions of the brain.

19. *Romanes*: on rats; use of their tails in the extraction of jelly from narrow-necked jars; on the intoxication of the *Medusæ*.

20. *Gillies*: on trap-door spiders in New Zealand.

21. *Gudden*: on various animals; effects of removal of the brain.

22. *Czermak*: on birds; the artificial production of hypnotism and catalepsy.

23. *Flourens*: on pigeons; results of removal of the cerebral hemispheres.

24. *Home* (Sir Everard): on the elephant and lion; effects of piano music.

25. *Smellie*: on the corncrake; its wariness.

26. *Marville*, on various animals; the power of music.

27. By many authors, on elephants, testing their ingenuity; their intellectual efforts.

28. Countless experiments on the dog—sometimes for wagers—to test or show its intelligence or sensitiveness, for instance, in the use of money; or its fidelity and integrity in defence of a trust; or its power of way-finding home, when taken over unknown ground by railways or steamboats.

A perusal of the foregoing list will show in how large a proportion of cases experiment was made upon *insects*; a circumstance in connection with which it is desirable to remind the reader how much experimental study of animal habits may be conducted under glass in our own libraries, studios, parlours, drawing-rooms, conservatories, or even bedrooms; for I know of one instance in which an enthusiastic young zoologist conducted salmon-breeding experiments in a small tank fitted up in his own bedroom. Hence the use of ferneries, Wardian cases, or other forms of closed glass vessels, aquaria, apiaria, &c., in the study of the habits of insects of such interest as ants, bees, and wasps.

The simplest experiment may give rise to a host of suggestive reflections. I have myself frequently performed a very simple experiment—which may be repeated by anybody—on the influence of harsh or caressing tones, looks, or attitudes, on dogs and cats, in the creation of confidence or fear; in calling forth affection or repressing it; in developing individuality, and testing character and courage. I have over and over again found that an angry word or scowl—a threatening attitude—will cause some dogs and cats to flee precipitately in alarm—sometimes backwards in case of seizure by their fancied enemy—while others bravely bark or hiss their defiance. Some show unmistakably their doubt whether the experimenter is in jest or earnest. There is obviously a conflict of feelings and ideas in their minds when they find a person who is in the habit of taking no notice of them, or of throwing them a friendly word, assum-

ing such forms of apparent hostility. I have often, by such means, shown the cowardice of pet dogs that were supposed by their mistresses to be very brave, because of their incessant barking at, and bold front to, strangers. On the other hand, a kindly look, a gentle tone, a friendly advance is seldom misunderstood—unless by the poor animal that has been rendered suspicious and timorous by its experience of human treachery and cruelty. In other words, there is nothing easier than for any man, woman, or child, to give to him- or her-self practical or experimental lessons in the power of human kindness to bring out in response all the better or finer features of an animal's nature, and of human cruelty to develope all the worse ones—in man's influence, therefore, for good and evil over the lower animal world.

Some of the experiments that have been made upon animals may appear to be, or are really, cruel and unnecessary —at least in their repetition—for instance, those relating to or involving—

1. The action of alcohol, laughing gas, chloroform, opium, belladonna, and many *poisons*.

2. *Mutilation* or *vivisection*, including removal of the head or brain, or portions of either or both.

3. *Self-destruction* in scorpions.

4. Various kinds of *deception*—in the form of practical jokes or otherwise—leading sometimes to the death of the animals experimented on, including the *substitution* of the eggs of different species of birds, or of stones or other bodies, in the nest of a hatching mother-bird.

5. *Destruction* of beaver dams, birds' nests, and spiders' webs.

There are, then, certain directions in which experiment need not be extended or repeated, especially by the general public. But, on the other hand, there are many directions in which *extended or renewed experiment* is not only legitimate but desirable, at or in the hands of persons of average intelligence and feeling, possessed of the necessary acquirements—the power of, or facility in, observing and recording facts, fertility of resource, and an acquaintance with what has been already done on the one hand, and what remains

to be done on the other. Spalding, for instance, points out the desirability of further experiment and observation on what he calls 'inherited acquisition'—a doctrine capable of experimental proof or demonstration. Houzeau, again, has suggested, as an important subject for future research—including both experiment and observation—the taming and studying, in their native countries, of the great anthropoid apes—particularly the soko, which is as yet known only to Livingstone—and other forms of the gorilla and chimpanzee. Among other legitimate and desirable, and at the same time harmless, subjects of experimental investigation by man is the effect of mirrors, pictures, and patterns on various animals.

Many experiments are performed for man by nature, by disease or injury in himself or other animals; but their value or importance is seldom evident, unless to the accomplished or experienced physiologist, pathologist, or naturalist. In the hands of such men, however, these experiments of nature's may be reproduced artificially—by imitation; so that the lessons they are calculated to teach may be duly learned and applied. In other words, the results of human experiment may be made, when necessary or desirable, to imitate those of disease or injury; or the diseases or injuries themselves may be deliberately produced.

The animals that will best repay man's observation and experiment—and that should, therefore, be selected for that purpose—are those that most closely resemble him, on the one hand, in structure and functions, and, on the other, in habits—that are most intimately associated with him as companions, servants, pets, adopting, as much as may be, his own mode of life. Hence the fittest subject for man's observation and experiment is the *dog*—his constant friend, companion, servant, and plaything; so like him—probably by reason of the intimacy of the personal association—both in character and habits.

CHAPTER V.

THE DAWN OF MIND IN MAN: MENTAL CONDITION OF CHILDREN AND SAVAGES.

PRIOR to a study of the genesis and evolution of mind in the young of the lower animals, it is all-important that the student should be previously well acquainted with the phenomena that constitute or characterise the dawn and gradual development of intelligence, on the one hand, in the human infant or child of civilised races, and on the other in savage man under the different degrees and conditions of his savagery.

The mental condition of the *human child* is of special interest, because various authors have instituted a psychical parallelism between the earlier stages of growth of the mind in man and its full development in other amimals; in other words, they hold that throughout their lives or in their mature condition the lower animals are mentally in the condition of children—that their mind in its prime is essentially childish. According to Houzeau, for instance, the mental development of the infant or child at various ages marks the levels which, in other animals, intelligence permanently attains; and long ago Locke, while quite recently Carpenter and other writers on mental physiology, have instituted similar comparisons and drawn similar inferences. But that there is only a certain amount of truth in such inferences is shown by the general results recorded in this volume, which go to prove the frequent psychical *superiority* of the lower animals—the dog, horse, elephant, parrot, or ape—over the human child, and even over the human adult.

Whatever be the result or advantage of such a comparison or parallelism, there can be no doubt as to the propriety

of the study of the *simple* preceding that of the *complex* in comparative psychology. And hence it is obvious that the student of comparative psychology should begin his enquiry by the systematic investigation of the simplest forms, earliest stages, first glimmerings of mind, reason, or intelligence, as illustrated in or by—

1. Man: (*a*) the child of civilised races; (*b*) lowest or savage man.

2. Other animals: (*a*) in their lowest forms; (*b*) the young of the higher groups.

Such a study of the *germs or rudiments* of mind in man and other animals should be gradually followed up by observations on the psychical condition of—

1. Man in all stages of savagery, barbarism, and civilisation, and

2. Other animals, in their different species, genera, and classes, beginning at the lowest, and ascending step by step in the zoological scale.

In the mental and moral condition of the human child, even of the most highly civilised races and of the most virtuous and talented individuals, the following points are specially noteworthy:—

1. The *language* of the infant consists at first of mere *cries* or *calls*, similar in character and object to those of other animals, and particularly of their young. It is by *imitation* of the sounds they hear that infants learn to speak.

2. *Consciousness* is only gradually developed.

3. There are no *innate ideas* (Melia). Infants acquire their earliest ideas at least, as other animals probably do, from their *senses* and sensations.

4. Infants are wholly occupied at first with the objects of special sense and sensation. The infant desires only the gratification of its physical wants (Pierquin).

5. They are governed by *instinct*, appetite, passion, uncontrolled by judgment and conscience (Elam).

6. There is no *religious sense*; it has to be created and cultivated.

7. The same must be said of the *moral sense*, or conscience, so that *moral responsibility* cannot be said to exist.

8. *Education* and time are necessary to the development

not only of the religious and moral feelings, but of reflection and thought, and to the regulation of the emotions and passions.

9. The general education or training of the child is on the same principles as that of the pup or other young animal (Carpenter).

10. The predominance of *emotion* or emotionalness.

11. What has been called the instinct of *cruelty* is characteristic of the child, and too frequently not only of the youth also, but of the adult, even in the most highly civilised races, as has been pointed out by John Stuart Mill and other writers. The natural or innate cruelty of the child, and the obvious *pleasure* it takes therein, are quite comparable, for instance, to the delight shown by monkeys in torturing their prey.

12. Amongst other characteristic *vices* of childhood are selfishness and self-indulgence, sulkiness or pettedness, combativeness and destructiveness; and it is only in the course of time that the child becomes enabled to neutralise or overcome such vices by the development of counteracting *virtues*, if indeed he is so fortunate as to possess the requisite measures of self-control, moral sense, and judgment.

13. The sports, tricks, and *mischievousness* of the child so closely resemble those of the young of certain of the lower animals, such as the kitten or monkey, that we habitually speak of our children being 'playful as kittens' or 'mischievous as monkeys.'

14. *Fearlessness* of deadly danger, of poisonous animals or fruits, of risks of all kinds to life and limbs, arises from *ignorance and inexperience*. In regard to incapacity of forming a judgment on matters that intimately concern its own personal safety, or of providing therefor, the child is obviously, as it is in certain other respects, *inferior* to lower animals.

15. *Imitation* operates as powerfully in the child as in other young animals.

16. *Curiosity* or inquisitiveness is as marked, and as apt to lead into danger, as in the case of so many animals, adult as well as young.

17. The mental *potentialities* of the child or infant can no

more safely or surely be determined than those of the young of other animals.

Inasmuch as such an animal as the adult, naturally or hereditarily intelligent, well-trained dog — as has been pointed out, for instance, by Miss Cobbe—has *moral sense* and is morally responsible, with *religious feeling* of the kind that has been described in another chapter, while it is capable of wonderful *self-sacrifice* and *self-control*, and exhibits remarkable sagacity and ingenuity, with a predominance of virtues over vices—such animals must be considered mentally and morally the *superiors* of the human infant and child, as they so frequently are also of the human adult.

In *savage* races of man the following features in their mental or natural history are specially deserving of consideration, as illustrating their psychical status compared with that of other animals :—

1. The absence of fixed shelter or *dwellings*, or their rudimentary character. Like feral carnivora, primitive man made use of caves, as do certain savage races of the present day.

2. Absence of *clothing*; bodily nakedness.

3. Ignorance of the use of *fire* for cooking or warmth—for instance, as found by the Spaniards, who first came in contact with the Ladrone Islanders (Büchner). The traditions of the ancient Egyptians, Phœnicians, Persians, Chinese, and Greeks point to the introduction and development of the knowledge and uses of *fire*.

4. Absence of *cookery*; the use of raw food, animal or vegetable.

5. *Morbid appetite* and depraved taste, including: (*a*) Geophagy—dirt- or earth-eating—fatal generally by dysentery or dropsy among the Indians of the Orinoco and other parts of South America, as well as among the Laplanders (Galt). Under this head may be classed the indiscriminate or omnivorous appetite of the Patagonians (Houzeau). (*b*) Ordure-eating. (*c*) Carrion-eating among the Zulus. (*d*) Placenta-eating of parturient mothers. (*e*) Cannibalism, even of their own children, parents, or other relatives—for instance, by the Caribs (Büchner).

6. *Filthiness* in their personal habits, excluding those connected with food-eating. Thus the Veddas of Ceylon show a 'habitual disregard of any sort of ablution' (Hartshorne). The Bushmen of South Africa 'never wash' (Richerer).

7. No sense of *decency*, modesty, chastity, or shame.

8. Their main object in life is the gratification of their *physical wants*. The only care of the Andaman Islanders, for example, is *food supply* (Owen). When the Bushmen of South Africa 'have enough food, they gorge and sleep.' (Richerer). Most savages are stimulated to a search for food only by hunger. The Australian 'knows almost no other sensation than that of the need of food, which he . . . . makes known to the traveller by grimaces' (Büchner).

9. Absence of ordinary *foresight* as to physical wants.

10. *Handlessness*, or awkwardness in the use of their hands (Houzeau); a disability common enough in civilised man—for instance, among many of our own peasantry.

11. Absence of *tools*, implements, and *weapons*—for instance, for fishing—among the ancient Caribs (Houzeau). There are either no tools, or scarcely any idea of using them, among the Mincopies, while the Dokos have no weapons (Büchner). The first *musical* instrument alike of the savage and of the anthropoid ape is a rudely-formed drum (Houzeau). Teeth, hands, and feet, however, are used as *natural tools and weapons*, just as they are by other animals. Thus Tinné mentions a Kanake of Honolulu, in the Sandwich Islands, who, climbing a cocoa-nut tree and bringing down some of the green fruit, 'tore the outer husk off with his teeth, getting purchase on the nut with his feet and hands, like a monkey.'

12. Want of *natural affection*. 'Mothers suckle their children only a short time, and then abandon them,' among the Dokos. Man and woman live isolated in certain hill tribes of India—the so-called 'ape men.' There is 'no domestic life . . . . no attachment to kindred' (Büchner). In East African negroes there is 'no attachment between father and child; but, on the contrary, there prevails, after the time of childhood, a natural enmity between father and son. . . . The children are sold; the wife is driven out of doors

at pleasure' (Burton). Among the Soudan negroes there is no family or personal love. Of certain South African negroes Dr. Rainey writes, 'It is seldom that one cares for another: the utmost they will do is to assist each other if their back itches. Even for their sick and dying they have no concern.' Among the Australian blacks 'it is only at the beginning that the mother concerns herself about her child. Afterwards the original connection is entirely forgotten'—in other words, the offspring is callously deserted. The Indians of Tierra del Fuego 'will sooner kill their old women than their dogs' (Büchner).

13. The universality of *infanticide*. The South African Bushmen 'will kill their children without remorse, strangling or smothering them when food is scarce. When a mother dies bearing an infant, it is often buried alive with her, to save the trouble which it would give' (Richerer). Putting to death the *aged* for similar reasons—to save trouble and food—is equally common. The Australian aborigines thus murder both their young and old. In New Caledonia the aged are buried alive (Büchner).

14. No respect for the *dead*; no proper burial or burial rites.

15. The *suckling* of young *animals* by women. Even at the present day Maori women give suck at their breasts to young pigs and dogs; 'a disgusting habit, for which I can offer no reasonable explanation,' says a recent traveller in the north island of New Zealand (Tinné).

16. *Fondness for other animals*, or the reverse; aptitude on the one hand for attracting their confidence, and thus taming them—for instance, among the Indians of South America (Brown)—and on the other abuse or ill-usage—a propensity and practice only too common also among civilised men.

17. *Cruelty* to each other, exclusive of the various forms already specified, including refinement in torture and enjoyment of the manifestations of pain, physical and mental.

18. *Wrestling for wives*—for instance, among the Indians—comparable to the strength trials that characterise

the love rivalry of the lower animals. They fight as birds and so many other animals do for the possession of the female.

19. The relation or proportion that mere instinct and habit bear to reason; the predominance of *instinct* over *reason* (Darwin). What is called instinct in the savage is frequently, however, really the result—as in still lower animals—of habit and reason.

20. The *acuteness* of the *senses* of smell, vision, touch, and hearing, in certain cases; their *obtuseness* in others. The Veddas, for example, are 'quite unable . . . . to discriminate between *colours*' (Hartshorne).

21. The peculiarities of their *æsthetic taste*—for colour, form, sound—in comparison with that of cultivated man.

22. *Insensibility* to kindness; absence of gratitude. 'The *treachery* of the negro is beyond belief,' says Baker.

23. *Combativeness* and quarrelsomeness. Many of their *wars* resemble those of ants in their ferocity, the *causus belli* being perhaps, the possession of a woman—as that of a white elephant is, or may be, in Burmah (Houzeau).

24. Want of the *moral* sentiments, and of *religious* feeling or belief.

25. *Incapacity for education* or instruction, for progress or improvement; including untamability. Hence their incapability for any work useful to themselves or to higher races of mankind. The aborigines of Borneo—in common with the Australian blacks, 'on account of their unbounded *stupidity*, cannot be used for slaves; while of certain African negroes in the American Slave States, a German traveller writes, "they seem totally incapable of any higher culture"' (Büchner). Arab sailors in Egypt are characterised by possessing 'no reasoning—no waiting for results' (Eden). The Andaman Islanders are untamable (Smith). 'The faculty of *memory*' among the Veddas 'is almost wholly absent;' so that a typical married male 'could not even recall the name of his own wife, until he caught sight of her and pronounced it mechanically' (Hartshorne). There is no 'thought reaching beyond the narrowest circle of things perceptible by the *senses*' in the negro of East Africa. He

has no sort of *logic*, and 'can *deduce* nothing from what he has observed' (Burton).

26. Incapacity for *generalisation*.

27. *Want of originality*, ingenuity, or inventiveness. In the present Polynesians 'there is no originality. Invention is unthought of,' says a correspondent of 'Nature.' A want of mechanical ingenuity characterises the Australian aborigines (Fox).

28. *Arithmetic* is rudimentary—where it can be said to exist at all. The Apache Indians have no notion of their own age, or of counting up years (Büchner).

29. No idea of *time*.

30. No systems of *knowledge*.

31. No *legislation*; no social or other laws—e.g. among the Dokos (Büchner).

32. No territorial, tribal, or other *property*. Dogs, wives, and children are possessed in common by the Australian aborigines (Houzeau).

33. No *history*; sometimes scarcely any oral traditions.

34. No *policy*, nor plans of action.

35. No form of *government*, even by chiefs or leaders—e.g. among the Dokos (Büchner).

36. No traffic nor *commerce*.

37. Absence of *agriculture*, or any kind of tillage of the soil; sometimes even no hunting of wild animals for food.

38. Want of *industry* of any kind; idleness and laziness. 'There is no inclination to labour' in the negroes of East Africa (Büchner).

39. Absence of *money* or *coinage*—for instance, in Central Africa, where barter is conducted by means of shells or by payments in produce.

40. *Imitation* enters largely into all their actions. When Lallemant endeavoured to make a Brazilian Botokudo understand anything by signs, 'he imitated every action, just as apes do' (Büchner). In this respect, as Pierquin points out, the negro resembles the monkey, or *vice versâ*.

41. The absence of *arts* (Houzeau).

42. *Navigation* by rafts, just as in the case of various lower animals (Houzeau).

43. The use of *spies* or scouts for the same purpose as in the bee—the discovery of suitable new dwelling-places (Houzeau).

44. The absence of *laughter*. The Veddas, we are told, 'never laugh' (Hartshorne).

45. Want of *facial expression*; impassiveness or characterlessness—immobility or invariability of feature. The Digger Indians have a 'face void of all mental expression;' while in the Brazilian Botokudo eyes, 'without lustre or soul,' look 'staring, dull, and without intelligence' (Büchner).

46. No specific or proper spoken *language*—for instance, among the Mincopies (Smith)—and hence incapability of conversation.

47. No civilities or *salutations*. Thus there is 'no notion of greeting, either at meeting or parting,' in the Apache Indians (Büchner).

48. *Love antics* comparable with those of certain birds.

49. Even the *forms* of *insanity* in savage and semi-savage races resemble those which are commonest among the lower animals. Thus the running amok (or amuck, as it is more usually called) of the semi-savage Malay is a peculiarly Asiatic and barbarous form of human insanity, though it is not absolutely peculiar to the East, nor to barbarous races—occurring occasionally in Italian sailors and other European peoples. It is characterised by a craving for indiscriminate murder—a sort of promiscuous homicidal mania—and is strictly analogous to that form of *ephemeral mania* in cattle which so frequently proves fatal to man in the crowded streets of our large cities.

50. Their wonderful power of *way-finding* has frequently been dwelt upon by travellers—a power that is unconsciously exercised while it is unintelligible to and inexplicable by its possessors, the savages themselves. It is based probably on habitual sensory impressions, involving keenness of observation, a quality which in the white settlers in the same regions—for instance, in the Australian bush (Nichols)—leads sometimes to equal acquisition of the same accomplishment. On the other hand, the savage, with his supposed

'instinct' of way-finding, frequently fails as a guide—probably from his loss of the *memory* of landmarks.

51. The *fear* of what is *novel* or unusual is quite as conspicuous sometimes as it so frequently is among the lower animals. Thus we are told, *à propos* of the dread inspired in certain jungle Veddas of Ceylon by the sight of a mirror, 'The first wheeled vehicle they saw filled them with alarm and terror; and as they bent eagerly forward to scrutinise it, they instinctively grasped the handles of their axes.' Boiled rice 'they at first seemed to fear would make them intoxicated or stupified.' And it may be added that the same kind of fear characterises the child of civilised races.

52. On the other hand, *curiosity* to ascertain the true character of objects new to them is as prominent a feature in the savage as in the child, and in many of the lower animals, adult and young.

I am not to be understood as asserting that all the foregoing intellectual or moral peculiarities, negative or positive, are to be met with in any one race of savage men; but that some of them are to be found, in various degrees and combinations, among all primitive peoples, there can be no doubt, if we can credit the many eminent travellers who have described the psychical condition of uncivilised man. That the savage, as a whole, is low in the scale of intelligence, compared with his civilised brother, is generally, perhaps, conceded. But there are many worthy people, whose wish would appear to be father to their thought, who, in the face of facts to the contrary, persist in believing that a 'potentiality' for culture and civilisation exists in all races of mankind, however primitive, however degraded. That intelligence, reason, morals, are frequently so low in their stage of development where they can be said to exist at all as to sink man, in countless instances, below the psychical level of many other animals, is what even the unbiassed student will not at first be prepared to believe—what throughout his enquiry he may even be led honestly to doubt. But his scepticism—when it exists—may be converted into belief by a careful study of the intellectual and moral condition of the following savage races:—

a. Asiatic races.

1. The Andaman Islanders of the Bay of Bengal, otherwise known as the Mincopies, who are, according to Professor Owen, the most degraded race of mankind.

2. The natives of Ceram and Malacca, or the Malay Peninsula (Elam).

3. The Papuans, or aborigines of New Guinea.

4. Certain hill tribes of Northern India, such as the Lepchas, Gonds, and Khasias.

5. The Ainos, or 'hairy men,' of Japan (Pumpelly).

6. The Veddas of Ceylon (Hartshorne).

7. The Samoiedes of Siberia.

b. American races.

8. The inhabitants of Alaska (Houzeau).

9. The Eskimo of Greenland.

10. The Digger, Apache, Mexican, and other Indian tribes of North America (Houzeau).

11. The Indians of Brazil and other parts of South America, including the Botokudos, or 'men of the woods' (Büchner).

12. The Caribs, the negroes of the Antilles, and the other aboriginal races of the West Indian Islands, including the creole negroes of Jamaica and the slaves of Cuba (Trollope).

13. The natives of Tierra del Fuego.

c. African races.

14. The Dokos of Abyssinia (Brown).

15. The Nuehr savages of Central or Northern Africa (Baker).

16. The Latukas of the region of the Nile sources (Baker).

17. The negroes of Eastern Tropical Africa (Burton).

18. The Kaffirs (or Caffres), Hottentots, Bushmen (or Bosjesmans), and other tribes of Southern Africa.

d. Australasian and Polynesian races.

19. The Australian aborigines, especially the 'black fellows' of Western Australia. By various authors the native Australian blacks are regarded as a typical primitive people, with a striking resemblance in their habits to Palæolithic man (Fox).

20. The natives of Tasmania.

21. The Maoris of New Zealand.

22. The aborigines of New Caledonia.

23. The natives of the Marianne or Ladrone (Thieves' or Lazarus) Islands, and of other South Sea or Oceanian islands (Büchner), some of whose names, bestowed on them by navigators, bear testimony to the theftuous propensities of their inhabitants.

These are all foreign, heathen, and *coloured* races—extra-European, and characterised by blackish, brownish, or yellowish skins. But there are also

e. European races—even highly civilised Christian peoples, boasting incessantly of their high state of religious and moral culture, that possess in their very midst *white savages*, whose intellectual and moral condition is quite as instructive as, and infinitely more important than, that of remote primitive races. I need only refer to some of our own country, to wit—

24. The 'savages of North Devon,' as described by the commissioner of the 'Daily Telegraph.'

25. The labourers of the potteries and collieries of central England, the dog-fighters and women-kickers of Hanley and other villages of the 'Black Country'—in more respects than one a country well named.

26. The 'gutter children' of the 'wilds of London,' according to Hollingshead and so many others.

27. The whole of the 'criminal class' of our great cities.

These fellow-countrymen of our own voluntarily place themselves—if indeed the possession of normal freedom of will be granted them—on a level with what it were a farce to call, in contrast with such men, the 'lower' animals, when they engage with bull-dogs in duels of the kind which rendered Hanley famous in 1874.

Among the psychical peculiarities of these our brother men in Christian England are—

1. The absence of any *religious* sentiment (Elam).

2. Want of the *moral* sense in the whole criminal class (Despine). No appreciation of *duty* (Elam).

3. Low general *intelligence*.

4. *Incapacity* for intellectual or moral *education.*

5. *Immorality* of all kinds; debauchery; the social evil.

6. *Depraved tastes,* including especially intemperance.

7. *Crime,* especially theft—for instance, by the professional thieves of London, or by the frequenters of, or loafers at, the Liverpool docks.

8. *Cruelty* to each other, of a kind that it is a libel on other animals to designate 'brutality'—for instance, wife-kicking by the Lancashire navvy.

It is of importance to note in how many respects the mental condition of savages corresponds with that of the *child.* Thus we are told that mentally the Australian aborigines are 'mere children,' finding 'amusement only in childish tricks and trifles. . . . They cannot be taught any principles. . . . They know no sentiment . . . . but only unbridled passions and the sense of their nothingness against the white races' (Madame Bingmann). Again, the East African negro 'combines all the incapacity and credulity of childhood with the obstinacy and stupidity of age' (Burton).

It is a corollary from the psychical parallelism that exists between the children of civilised races with certain of the lower animals on the one hand, and savage adult man on the other, that, as Houzeau and so many other authors point out, savage man is intellectually and morally indistinguishable from many of the unfortunately so-called 'lower' animals. According to Owen, Agassiz, Huxley, and others of our most celebrated naturalists, there is no distinction between the psychical phenomena of a Bosjesman adult, or of an European infant, or of a mature cretin, and those of such animals as the chimpanzee, save in *degree,* if even that difference always exists. Where it does exist, it is not necessarily in favour of man.

Darwin and other writers have drawn a comparison between savage men and certain other animals—in respect, for instance, of morals—not in favour of man. Pierquin asserts the *superiority of the lower animals*; and no doubt his assertion is well founded as between certain intelligent, well-educated, and well-behaved dogs, horses, elephants,

chimpanzees, parrots, or other animals and whole races of savage man—that 'noble savage' who ran 'wild in woods,' and of whom we hear so much from Exeter Hall! If the student will take the trouble of comparing, one by one, the negative qualities—intellectual and moral—of savage man, as hereinabove described, with the positive qualities of certain other animals—especially the well-bred dog—the conclusion arrived at will probably be what appears to me the inevitable one—that *psychical superiority* frequently pertains to the 'lower' animal and not to man

CHAPTER VI.

EVOLUTION OF MIND IN THE ASCENDING ZOOLOGICAL SCALE.

I. *The Invertebrata.*

So little is at present known of the phenomena of mind in the lowest classes of animals, that it is impossible as yet to give any comprehensive and exact outline of the genesis and development of mind in the animal kingdom as a whole. We know a great deal about the mental or moral character of the dog, cat, horse, elephant, and other Mammalia; of the parrot, starling, domestic fowl, canary, sparrow, and other birds; of the ant, bee, wasp, and other insects; but of mind in all other classes of animals our knowledge is as yet and at present most limited and fragmentary.

What are the earliest dawnings of mind—whether they are concomitant with the earliest appearance of animal life, or whether they are to be met with in the vegetable kingdom—depends very much, if not altogether, on what are our conceptions of the constitution or essentials of mind—what are our *definitions* of such things or terms as sensation, sensibility, sensitiveness and sense, consciousness, will, emotion or feeling, thought and knowledge, memory, instinct, intelligence, and so forth.

If we use such terms in their widest and general acceptations, we must regard mind as beginning in the vegetable kingdom. If, on the other hand, we re-define all these, and allied or included, terms, so as to be applicable to man alone, or to man and other animals, difficulties of an insuperable kind will, I fear, be met with. Any such *re-definition*, moreover, will necessitate the multiplication of technical terms for the distinguishing of processes which I believe to be

essentially the same in plants, the lower animals, and man; and such a multiplication of terms will only still further confuse a subject already rendered needlessly intricate by man's ingenious refinements in word-splitting.

Though our present knowledge is fragmentary and unprecise, it is nevertheless desirable to attempt a general sketch of the kind and amount of data we possess, upon or from which to begin the construction of a future science of *comparative psychology*. It is proper to expose our ignorance and deficiencies, in order to point out to the student the direction in which research is desirable and likely to yield profitable results.

Beginning with the lowest subkingdom of the Invertebrata—the *Protozoa* of zoologists—certain of the *Infusoria*, or *Rhizopoda*, according to Dr. Carter, exhibit will, determination, fixed purpose or aim, intention, cunning, ingenuity in the adaptation of means to an end, the recognition of food and the selection thereof. The *Vorticella* is said to 'contract itself upon its stem when alarmed or irritated' ('Globe Encyclopædia'). Among the *Rhizopoda* Carpenter refers to the selection of the materials of construction by and to constructive art in *Amœba*; while Houzeau mentions way-finding to food supply in *Actinophrys*; and Carter assigns to both animals observation, will, and intention in their food-search. Pouchet speaks of the *Amœba*—the so-called proteus animalcule—changing its shape 'at will.' In the *Protozoa* feeling is excited by external impressions.

Here we have, then, at the very base or beginning of the zoological scale, in the capture of prey a whole series of mental phenomena exhibited—will, purpose, choice, ingenuity, observation, feeling; and these aptitudes doubtless involve others, such as sensation and consciousness, patience and perseverance. It seems incontestable that choice or preference in the selection of food is a characteristic of the very lowest animals. And if this be the case, certain at least of the mental qualities above specified—with others—are necessarily involved.

ding a stage higher, among the *Cœlenterata* we have,

in the new *Theco-medusa* of Professor Allman, and in *Campanularia*—each individual retiring into its horny dwelling when danger threatens—a phenomenon that involves a sense of danger, a knowledge of the means of avoiding or escaping it, and the adoption of these suitable means in prompt action. What is essentially the same process, however, has already been described—in *Vorticella*—among the *Protozoa* (*Infusoria*). In the pursuit and capture of prey various of the *Cœlenterata* 'excel in dexterity,' Dr. Macintosh, of British annelid celebrity, writes to me. Dr. Andrew Wilson speaks of the 'intelligent seizure of matter or pabulum adapted to its growth' by the *Hydra*.

In the third subkingdom—the *Annuloida* and of its class the *Echinodermata*—we are told that brittle stars 'can scarcely be procured for a museum in a tolerably perfect state, because they throw off ray after ray, and in fact break themselves to pieces, upon any alarm' ('Chambers's Encyclopædia'). The 'Guide to the Brighton Aquarium' also speaks of this habit of starfishes, 'when irritated, of dismembering their bodies by throwing off their arms. The spiny star . . . . has shown a tendency to so mutilate itself; and this practice extends to every specimen yet introduced into the Aquarium.' Houzeau, too, points out the effect of emotion on *Ophiocoma* in causing it to fall to pieces.

In the fourth subkingdom—the *Annulosa*—a considerably greater range or variety of mental phenomena is met with. Among the *Annelida*, the Tubicolæ, or tube worms, retreat into their abodes 'at the slightest alarm;' a phenomenon, as we have seen, that occurs even among the *Protozoa*. There is selection of materials of construction, as well as constructive art, in *Terebella* (Carpenter)—phenomena, however, that are to be found so low down in the zoological scale as *Amœba*.

It is well known that the angler desiring bait has only to create slight succussion of the soil, by stamping on it, to lead his prey, the earthworm, to come to the surface, a circumstance usually attributed to the dread of its enemy the mole, which makes a somewhat similar movement of the earth in its mining operations. If the fact be as stated, and its explanation be accepted, we must have here a distinct

dread of one enemy, and a knowledge of its operations, with ignorance, however, of the ruses of another more formidable one. There must be an association of ideas, though an erroneous one—an error of inference from, or interpretation of, a sensation. There is, in short, an early illustration of the *fallibility of instinct.*

Dr. Strethill Wright, a very competent authority, obviously ascribes intelligence to the female *Spio seticornis* when he says of her that she 'has all her senses about her.' The emotion of fear and the realisation of danger are common in crabs, lobsters, and other *Crustacea.* Mrs. Treat, of New Jersey, saw a *Cypris,* an entomostracous crustacean, 'slowly walking round a bladder [of *Utricularia clandestina*], as if reconnoitring. . . . Coming to the entrance of a bladder, it would sometimes pause a moment and then dash away. At other times it would come close up, and even venture part of the way into the entrance, and back out as if afraid. Another, more heedless, would open the door and walk in. But it was no sooner in than it manifested alarm—drew in its feet and antennæ and closed its shell' (Darwin).

Will is involved in the opening and shutting of the carapace of the common *Cypris,* while the search for food is probably common to these and other minute aquatic animals (Darwin), as it is even to the *Protozoa.* Bates and Gardner assert that *will,* in the form of voluntary determinate action, is displayed by certain *Crustacea*; while Houzeau assigns to them *memory.* There is perception of *time* also, as illustrated by the observance of regular feeding hours (Houzeau).

Buckland describes fear and the sense of danger in crabs in presence of the octopus in the Brighton Aquarium. Of the amphibious *crabs* of St. Paul's Rocks Professor Sir Wyville Thomson writes, 'They were much more wary than the birds. It was by no means easy to catch them; but they kept close round the luncheon baskets in large parties, raised up on the tips of their toes, with their eyes cocked up in an attitude of the keenest *observation.* And whenever a morsel came within their reach there was instantly a struggle for it among the

foremost of them.' 'They had,' he adds, 'a look of human smartness about them, which had a kind of weirdness, from being exhibited through a set of organs totally different in aspect from those to which we usually look for manifestations of intelligence.' Some other crabs post *sentinels* when changing their shells (Watson).

The hermit crab seizes the dwellings of other animals—the shells of Mollusca—killing the said animals themselves, according to some authors; but in some cases at least, when the shell is inhabited by a living mollusc, waiting till its death, and then tearing it out, devouring it, and taking possession of its empty abode. According to Professor Alex. Agassiz, they carefully *examine* these shells, as to their suitability, before adopting them as their homes, settling down 'with immense satisfaction' in those they select. The *stratagems and manœuvres*, moreover, of rival hermit crabs, desirous of possessing the same shell, are described by a recent journalist as 'the funniest sight in the world.' Further, a certain species of hermit crab shows 'care and *affection*' for the cloak anemone which is attached to its shell home. 'He has been noticed to feed the anemone with his pincerlike claws.' And when he casts his shell for a larger one, 'he carefully detaches the helpless anemone from the old habitation, and assists it in gaining a firm basis and support on the new shell.' Hermit crabs are further noted for their *pugnacity* and for their cunning in attack, which they make at unawares.

Pliny credited the pea crab with observation, watchfulness, adaptation, friendship, and jealousy; but his opinions have been generally regarded as Utopian, the mental qualities ascribed to such an animal as fabulous. That certain crabs possess all these, and many other, mental aptitudes is no longer, however, a matter of doubt, thanks in great measure to the opportunities of studying their habits afforded by *marine aquaria*. And this is just one of the points in regard to which the most modern and advanced have proved certain ancient or classical, and supposed ignorant, authors to be correct, both in their observations and inferences.

Lobsters show mental qualities of a higher kind than

those characteristic of crabs. Thus one described as a lady's pet in Paris 'seems to recognise its mistress, and is so fond of music that it is always drawn to the piano whenever she plays.'[1] Lobsters show affection for their young, warning them of danger, both young and old seeking *shelter* when peril is threatened or imminent. The old lobster, in alarm from danger, rattles its claws (Peach). According to Pennant, lobsters 'fear thunder, and are apt to cast their claws on a great clap. I am told they will do the same thing on firing a great gun.' That these are facts has been proved by the testimony of many subsequent observers. One of the latest, a writer in 'Land and Water,' says in regard to a 'most extraordinary clap of thunder . . . . forty lobsters not only shed their claws, but many of their lesser legs,' a circumstance that seems parallel to the casting of the limbs by the *Ophiuridæ*. Among the *Annuloida* sudden exposure to light is stated by the same writer to have produced a similar effect. A large number of lobsters having been kept alive in a dark coal-cellar for three or four days, till required for the table, 'immediately upon being exposed to the light shed all their large claws.' In both cases we have a marked instance of a physical result instantaneously brought about by a startling impression on the *senses*—of hearing in the one case, of vision in the other.

Among the *Arachnida* the intelligence, industry, ingenuity, perseverance, cunning, and other mental qualities of *spiders* are well known. An Australian spider constructs a door with bolts (Baden Powell). There are trap-door spiders, that construct and make use of a self-acting hinge to their door, which, as mere machinery, is superior to much of man's (Baird and Moggridge). Our ordinary British and other spiders *devise* means for overcoming difficulties, and make *repairs* of their webs, temporary or permanent (Watson). They must appreciate losses before making them good; they must estimate weakness before they strengthen weak threads. They have a knowledge of mechanical strain; they vary the structure of their web with its position (Houzeau). They even *test* the strength or security of their webs

[1] 'North British Daily Mail,' Feb. 8, 1875.

('Percy Anecdotes'). They are liable to be *deceived* and to commit *errors*, but they discover and rectify their mistakes. Some of them are bold and courageous; hence the specific name of one of them, *Galeodes intrepida* (Baird).

Others are weatherwise in a sense: they have a physical presentiment of coming atmospheric changes, by being extremely sensitive to weather vicissitudes. These weather changes produce an immediate effect on their habits, inducing either industry or idleness, vivacity or languor, as the case may be. As delicate indicators of weather change, they are said to be superior to man's meteorological instruments ('Percy Anecdotes'). Lastly, they are adepts at spinning or tapestry-weaving. The tarantula spider and the scorpion sometimes attack man from *revenge* or fear (Kirby and Spence). The scorpion is one of the animals which seems deliberately to commit *suicide* by stinging itself fatally, a circumstance that will be further alluded to in the chapter on 'Suicide.' It does so under the influence of such motives as fear or despair. Houzeau describes memory as a characteristic of the *Arachnida*, as well as a certain perception of time, inasmuch as they observe regular feeding hours, a phenomenon also exhibited by certain *Crustacea*. A writer in 'Science Gossip' describes a trap-door spider as 'fairly trembling with *excitement* and *impatience*' on the approach of prey.

Certain *Centipedes*, among the *Myriapoda*, sometimes attack man from revenge or fear, as do also the tarantula spider and scorpion (Kirby and Spence). But we know very little of the mental characteristics of the *Myriapoda*.

Of the class *Insecta* we know a great deal as to the mental character of the bee, ant, and wasp, belonging to the order *Hymenoptera*; of the *Termites*, belonging to the order *Neuroptera*, and of many beetles representing the order *Coleoptera*. So much has been written regarding the so-called instinct or intelligence of the ant and the bee, so accessible are the works of the Hubers, Kirby and Spence, Westwood, Wood, and other authors, that it would be a waste of space to recapitulate their descriptions here. But it would be equally improper to dismiss the important class *Insecta* without illustrations

—taken from other orders and genera than those above mentioned—of their mental character, of the wonderful degree or kind of intelligence that pervades it. Nor is it possible or proper to omit a summary of the leading psychical characteristics of such insects as the ant, bee, and wasp, because it is most important by-and-by to compare these characteristics with the mental endowments of some of the highest even of the *Vertebrata*.

In a psychical point of view, by far the most interesting order of the *Insecta* is that of the *Hymenoptera*; while of the Hymenoptera by far the most important genera and species are the various *ants*. It is unnecessary for present purposes to point out the names and number of these genera and species, which are to be found in the Appendix; but it is always to be borne in mind that the term 'ant' is a very comprehensive one, infinitely more so than 'man,' 'dog,' 'horse,' or 'cat,' of each of which there is only a single species and genus. The mental character of one species or genus of ant is not, therefore, necessarily that of another; on the contrary, there is the same kind, and even a greater degree, of psychical variety among the different genera and species of ant than among the different races or breeds of man, the dog, horse, or cat, or among individuals in man. This subject, however, is more fully treated of in the chapter on 'Individuality.'

It is only possible here to summarise, by a sort of tabulation, the leading psychical characteristics of ants as a group. These characteristics include, then—

1. Co-operation for a given purpose.

2. Division of labour, including the working by turns and the use of relief parties.

3. Use of, and obedience to, authority, including the employment of a language of command.

4. Understanding each others' language—a language apparently of touch.

5. Organisation of ranks, including military organisation and discipline.

6. Knowledge of the possession of power, and the use of it, including the subjection of the weak by the strong,

and the subserviency or servitude of one race or rank to another.

7. Judicial punishment of disobedience or rebellion.

8. Forethought or providence, real or apparent.

9. Practice of agriculture, including harvesting and storage.

10. Respect for, including interment of, the dead.

11. Mourning in bereavement, or its semblance.

12. Funeral or other ceremonies, including processions.

13. Use of natural tools or instruments and weapons.

14. The passion of rage or anger.

15. Imagination and its derangement in delusion—e.g. in the results of braidism.

Of the *Neuroptera*, the *Termites* or *Termitidæ*, or white ants, exhibit the same kind, and almost the same range, of mental phenomena as the true ants. Some of them, for instance, are represented as being *agriculturists*, cultivating fungi in their subterranean galleries, on the walls of the nurseries for the young. They exhibit *foresight* in the construction of long clay chimneys for communication with air or land, or both, during inundations (Houzeau). They establish colonies (Kirby and Spence). There are ranks in their societies, with corresponding division of labour (Westwood). They search for food, take care of eggs and young; recognise and perform certain *duties* and obligations; have a sort of *worship* even in the adoration of their queen. They have an ideal and ideas of fecundity in connection with this queen. Their soldiers exhibit wonderful pertinacity, and are capable of *self-sacrifice* (Michelet). Their edifices or constructive works include galleries and corridors, magazines, nurseries, royal chambers and hall, offices, ordinary rooms and egg rooms, floors and ceilings, pillars, and other appurtenances.

Many of the *Coleoptera*—beetles—are distinguished for their *cautiousness*. They *experiment* by touch, and thus acquire convictions of safety or the reverse. They *test* the strength of materials (Watson and Berkeley). They counterfeit death when alarmed, in danger manifesting remarkable self-possession or *presence of mind*. They ask and obtain

assistance from each other; they co-operate efficiently for a common end, and they show marvellous ingenuity in compassing that end (Gleditsch). There is great readiness in the seizure of *opportunity*—for instance, to escape an enemy or a danger (Figuier). The *Carabidæ*, in attack, use force, or they entrap by ambuscades or pitfalls, as circumstances may require (Baird). The *tiger beetle* is so called from its ferocity of disposition, especially in war. Its pugnacity and pertinacity are notorious (Westwood). Not a few beetles show the *fortitude* of the Red Indian in allowing themselves to be roasted alive without flinching. Beetles, moreover, manifest mutual affection (Darwin).

In the order *Hemiptera, Aphides* become domesticated, and happy in their state of *domestication*, as *servants or slaves* to ants. They occupy the position to ants that milk cows do to man, yielding, at the desire of their masters, the coveted honey-dew—a saccharine fluid of which the ants are very fond (Meldola, Figuier, Kirby and Spence). They understand the mimic language of the ants when honey dew is wanted—the peculiar strokes or touches of their antennæ, which are used, perhaps, both to signify their wishes and to stimulate the secretion. The ants *caress* their servants, *coaxing* them to the desired secretion. The herds of Aphides are 'milked' regularly by their proprietors; the honey dew is drawn off very much as milk is. And so much are this honey dew and its producers valued by the ants, that the possession of honey-giving Aphides becomes a subject of questions of *property*, and thereby of ant wars (Houzeau), which wars are undertakings of a very *systematic* kind and on a large scale. The female water-bug exerts choice in mating. She can and she does entertain and express her *aversion* to particular males (White).

Among the *Orthoptera*, the male *cricket* expresses, by means of sounds, pugnacity, rivalry, satisfaction, and alertness; and it foretells rain in the same way (White). Baird refers to its timidity or readiness to take alarm, and Figuier also represents it as easily scared by certain sounds. On the other hand, it is fascinated or charmed by vocal harmony, is attracted by man's imitation of its cry, and sings

in concert with man (Figuier). The common *earwig* 'gathers her young ones around her and under her in the most affectionate manner,' as a hen does. It shows great anxiety or solicitude concerning its eggs, brooding over them; and the young seek protection under their mother, just as chickens do (Baird).

Of the *Lepidoptera*, butterflies have been tamed and taught to come at man's call (Wood); there is a decided observation of *colours*, as there is among bees also, with an admiration of or preference for bright ones (Darwin); while *caterpillars* exhibit adaptation of means to an end—search for suitable positions for safety, repose, or development, and make ladders on glass (Buckton).

Among the general mental characteristics of the *Insecta* as a class are the following:—

1. Great variations of temper and disposition.
2. Likes and dislikes.
3. The passions, feelings, or emotions of fear, anger, or rage, love, sorrow, impatience, pleasure, and pain.
4. Appreciation of beauty in form, colour, and sound, including musical tones and call notes.
5. Ingenuity or fertility of resource in difficulty, including the use of tactics and stratagems in procuring food.
6. Acquisition and application of knowledge gained from experience.
7. Reception and communication of information, including the exchange of ideas.
8. Formation of associations for specific objects—mutual assistance, society, or emigration.
9. Obedience to orders.
10. Making deviations from routine in constructive or other operations.

In the highest subkingdom of the *Invertebrata*, the *Mollusca* are the most interesting class, containing, as it does, the now well-known *octopus*—a huge cuttle-fish, better known as the *poulpe* of the French and the *kraké* of the Norwegians. According to Lloyd, of aquarium celebrity, this animal displays purpose amounting to forethought. It manifests excitement, irritation, and restlessness in confine-

ment. It protects its ova from danger, real or supposed. The female guards the hatching ground, while the male is prepared to fight in defence of the female and her ova. When brooding the latter shows constant vigilance in the care of her eggs, bestows unwearied attention upon them, protecting them from every threatened injury, the male in the meantime looking savage and making feints of attack upon threatening intruders or enemies (Lee). There is every reason to suppose that in such cases *imagination* is at work in the mother or father, or both, creating *ideas of danger* where no real danger exists, or exaggerating the character of any danger that may be threatened. And if, as is probable, imagination is at work in the parent octopus—and imagination, moreover, that may be *morbid* in its intensity—this mental quality or condition obviously exists in animals very much lower in the zoological scale.

Professor Kollman, of Munich, who studied its habits in the Naples Aquarium, describes the octopus as recognising its keepers, 'actually manifesting attachment for these men;' as resenting the intrusion of new-comers into the tank with 'jealous hate;' as showing courage and persistency in its attack on prey, as well as intelligence in the mode of getting at its prey by climbing over a barrier between two tanks; as exhibiting *rivalry* in love, with its usual result in much higher animals—jealousy and combativeness amounting even to 'ferocity;' as manifesting 'energy, fierceness, and determination' in the protection of the eggs; as expressing emotional changes or states by play of colour through nearly all the shades of the rainbow, 'so that it is easy to tell, therefore, whether he is angry, pleased, frightened, or sleepy.' The squid in the Brighton Aquarium is described as performing quadrille figures—in other words, as dancing (Lee).

In the *Gasteropoda*, pairing is preceded by *courtship*; they contract *attachments*, and there is *association of ideas* (Elam). There is also a perception of time, inasmuch as stated feeding hours are punctually observed (Houzeau). Snails are capable of *concerted action*.

Now, if we review carefully, and analyse, the various

mental qualities that have just been described as characteristic of various subkingdoms, classes, and orders—genera and species—of the *Invertebrata*, or lowest half of the animal kingdom, it will be found that we have already before us all the elements or *essentials of mind as it occurs in man.* Though not developed in equal degree, we have nevertheless the higher, as well as the lower, constituents of mind—reason, intelligence, thought, as well as mere sensation, instinct, and reflex action. And, moreover, it is evident that *intelligence* begins at the very base of the zoological scale.

Such a survey and analysis will show us that the Invertebrata possess and display the following attributes of mind as it occurs in man :—

1. *General intelligence.* In the ant especially it has been noticed and commented on by countless writers of the most diverse character, from the days of Solomon downward. Cicero very properly endowed the ant with mind or reason, including memory; and the most modern and most competent authors, such as Houzeau and Belt, do the same. So high is their intelligence that ants have been by many authors regarded as, in many respects or senses, *prototypes of man* (Darwin). Their social or political organisations represent semicivilised societies of man, according to Houzeau, who indeed places the ant nearest to man in regard to its social condition; and Belt, who was struck with the intelligence displayed by the foraging ants of Nicaragua, remarks that 'perhaps, if we could learn their wonderful language, we should find that, even in their mental condition, they also rank next to humanity'—a striking admission from an otherwise out-and-out Darwinian. Houzeau seems to me quite justified in saying that there are in certain insects, such as the ant, intellectual processes comparable in kind to those of man. The undermining by beetles of a stick with a spitted toad stuck upon its apex, in order that, by the fall of the top-heavy stick, they might reach their coveted food, involves the possession of a high degree of intelligence or reason (Gleditsch, Kirby and Spence). Professor Kollmann credits the octopus with a high degree of intelligence.

2. *Memory* must occur at a very early stage in the zoological scale, and there are authors who ascribe it even to plants. Among the Invertebrata it has been specially noted in insects, Crustacea, and Arachnida (Houzeau), and in Mollusca (Macalister).

3. *Volition*, or will—in the form of perseverance, decision, and intention in prosecution of a definite purpose, end, aim, or object—is also displayed among the lowest animals, in connection especially with the search for, pursuit, and capture of food or prey.

4. *Feeling*, emotion, and passion are exhibited in a considerable variety of ways, including the conjointly physical and mental feelings of pleasure and pain, as well as the emotions of fear, grief, love, revenge, anger, patience and impatience, cruelty or ferocity, jealousy, rivalry and competition.

5. *Thought* is involved in many of the operations of the ant, bee, octopus, and other animals. Kirby and Spence most properly assign both *reason and instinct* to various insects; and there is every ground for supposing that such a combination characterises, in a different degree only, the lowest of the Invertebrata.

6. *Love* (sexual), preceded by courtship and leading to pairing.

7. *Affection* or attachment, including friendship or companionship, parental or fraternal, is exhibited by the octopus, hermit crab, and other animals.

8. *Choice* is illustrated in the selection of the proper aliment or of a mate.

9. *Adaptation* of means to an end, including ingenuity in the devising and use of the proper means; and the application of test or experiment.

10. *Calculation* or estimation of the strength or weakness of material, and of space, height or distance, and weight, involving the practical application of certain principles of mechanics.

11. *Appetite* or desire—for food, at least—exists apparently in the very lowest animals, based probably on the sensation of hunger, which prompts, stimulates, or excites to

the satisfying of the craving for food. The use of means in procuring coveted aliment, based upon a feeling of necessity for food, is perhaps the earliest indication of mind in the animal kingdom. Even here appetite becomes *morbid*, and this morbid appetite sometimes assumes the form of *cannibalism*. For instance, the male poulpe devours his own offspring, fondly as he behaves in general towards the eggs and their mother.

12. Formation, association, and communication of *ideas*, and ideas even of a *generalised* kind, such as those pertaining to danger.

13. *Imagination*, especially connected with ideas of possible danger; apt to become—as are sensation, consciousness, ideation, emotion, volition (in short, all the faculties of mind, lower or higher)—perverted or *deranged*; these morbid states being the foreshadowing of the marked mental defect or disorder—*insanity* and idiocy—that so frequently occur among the higher of the Vertebrata.

14. *Character* or disposition is sometimes so well marked as to amount to *individuality*. Of individual disposition *temper* is sometimes a prominent feature; and there are already those *inconsistencies*—those puzzling contrasts, antagonisms, and combinations of virtues and vices—that are so common among the higher Vertebrata, including man himself. Thus in the male poulpe we have a strange mixture of masculine virtues and vices—the chivalrous defence of the female on the one hand, and the selfish cannibalism of his own offspring on the other.

15. *Improvability*, in so far as they profit by experience.

16. Liability to *error*, including, however, the discovery and rectification of mistakes.

17. Simulation and other forms of *deception*.

18. Use of a *language*, intelligible at least to all individuals of the same species; including also, however, intelligibility of *human* language, in so far as concerns, for instance, man's orders; along with that of other genera and species in case already given of Aphides and ants.

19. *Obedience* to leaders or masters, including man—in other words, recognition of, by submission to, the *authority*

of might, strength, or power. This implies, in insects that are governed by queens, respect for, *worship* or adoration of, royalty.

20. *Sociality* or sociability, including the formation and enjoyment of *companionships* with other individuals, genera, and species, involving *domestic harmony.*

21. *Co-operation,* on the principle that *union* gives strength, implying an appreciation of the necessity for or value of *mutual aid.*

22. *Æsthetic taste*—the perception of beauty in form, colour, and sound.

23. Use of natural *tools and weapons*—for instance, in the capture of prey. Thus the sea-nettles, sea-blubbers, sea-jellies, or jelly-fish—various genera and species of *Medusidæ,* belonging to the *Cœlenterata*—benumb their prey or their enemies by stinging with their thread cells.

24. *Phosphorescence* of certain *Medusidæ* under irritation or excitement (Nicholson), just as the octopus exhibits *colour-play,* like the chameleon.

25. Perception, if not even the enjoyment, of *musical cadence* and rhythm in certain Crustacea (Darwin) and Insecta.

26. *Observation,* in the form especially of watchfulness over the movements of prey or of enemies, and including *investigation,* examination, survey, and search for food or domicile; implying also a perception of external relations or conditions, as well as a recognition of each other, of friends and foes, and even of man; and the *discrimination* of differences, which involves a *comparison* of one thing with another.

27. General *energy or vivacity,* even in apparently so sluggish an animal as the earth-worm (Jesse). In such insects as the ant it is very conspicuous in the form of industry in the various trades in which they are engaged, or in eagerness in carrying off prisoners, prey, or other booty.

28. *Physical sensitiveness* to—

a. Weather changes, and all the separate influences they involve.

b. Chemical, electrical, and mechanical stimuli or irritants.

29. Distinct conceptions of the nature and nearness of *danger*, including a very decided recognition of enemies, and its results in the various means adopted for concealment or escape from or deception of them.

30. *Self-control*, involving firmness and coolness in emergency.

31. Certain conservative *vices*, such as selfishness, a careful and constant regard to their own physical interests, with pugnacity or combativeness.

32. Certain *virtues*, such as courage, pertinacity, or resolute perseverance.

33. *Judgment* in the selection of one of several alternative modes of escaping from enemies, avoiding danger, securing food.

34. Appreciation of *kindness*, as illustrated by recognition of and attachment to their masters or keepers by the octopus (Kollmann), wasp (Lubbock), and butterflies.

35. Actuation by adequate *motive*.

If, now, we compare one subkingdom of the *Invertebrata* with another, as to their psychical characteristics, it may be said that there is a sort of evolution or development of mind as we pass upwards from the *Protozoa* to the *Mollusca*. There are, however, many striking irregularities or exceptions, or what at present appear to be so. Thus, while there can be no doubt as to the superior development of mind in the *Annulosa* as compared with any of the three subkingdoms below it, the true ants, which belong to the class *Insecta* of the Annulosa, with their allies—the white ants, bees, and wasps—occupy a much higher place, intellectually and morally, than any of the classes of the *Mollusca*, than most of the *Mammalia*, and, according to some authors, even than certain races of *man* himself. But it is probable that this pre-eminence will be diminished in proportion as we become better acquainted with the habits of other classes of the lower animals.

A contrast between the psychical powers of ants, bees, and wasps, on the one hand, and of other families of the

Invertebrata, on the other, is of importance as bearing on the question of difference in degree between the mental faculties of man and of other animals. Thus Belt ranks the foraging ant first in intelligence among the *Annulosa*, then wasps and bees, and then other *Hymenoptera*; and he points out that 'between ants and the lower forms of insects there is a greater difference in reasoning powers than there is between them and the lowest Mammalian.' Objection may, and probably will, be taken to every one of these generalisations of Belt's. Thus most students of comparative psychology may prefer to bracket the *Hymenoptera* and *Neuroptera*—the true ants in the one, and the scarcely less interesting white ants in the other, as very much on a psychical equality, and occupying a higher platform than wasps or bees; while the difference in the psychical development of man and the lowest Mammalian depends altogether on the types of man and Mammalian selected for the comparison. If we compare the lowest type of lowest man with one of the lowest Mammalians that has been trained by man, or accustomed to association with him, the difference will probably be altogether in favour of the lower Mammal.

But, in truth, we are not at present in a position to compare, as to their psychical characters, the classes of any one subkingdom of animals, the orders of any one class, the genera of any one order, or the species of any one genus. We cannot be said to possess a proper knowledge of the psychical character of the individuals constituting the various races of the single species *man*; for, even in him, it has yet to be determined in what proportions and modes *instinct and reason* are correlated, how they overlap or pass into each other, what are the distinctives of each, if there is any real demonstrable distinction between them.

CHAPTER VII.

EVOLUTION OF MIND.

II. *The Vertebrata.*

AMONG the *Vertebrata*, as a whole, there is a much greater variety and number of mental faculties—the psychical character is more diversified and more developed—than in the Invertebrata. There are certain anomalies, however, due, perhaps, to our present defective knowledge, constituting—as in the different subkingdoms of the *Invertebrata*—apparent or real exceptions to, or irregularities in, the evolution of mind as we ascend in the zoological scale.

It would be an unnecessary waste of space to describe at any length, or in any detail, the psychical characteristics of the various classes, orders, or genera of the *Vertebrata*. All that can or need be here attempted is to set forth, as much as possible tabularly or concisely, those features—intellectual or moral—which constitute an advance on the psychical character of the *Invertebrata*.

In the lowest class, then, of the *Vertebrata*—the *Pisces*, or fish—though there is a wide *range* of psychical character, there is little if any advance compared with certain classes, and particularly with certain genera and species, of the *Invertebrata*. Most of their mental characteristics have been met with among the Invertebrata. But many of these characteristics are, among fishes, more highly developed; or at least appear to be so, possibly from our better acquaintance with their habits, due to our greater opportunities of studying them, as well as from the usually greater size and conspicuousness of the animals themselves, and the facility with which their behaviour—especially in captivity—may

be examined or observed. Among the more noteworthy characteristics of fishes, then, are the following:—

1. The formation of temporary *alliances*—offensive and defensive—involving a common and specific object; with *action in concert.*

2. Conjugal, parental, and paternal *love.*

3. The depressing *passions*, such as grief from bereavement, sufficiently powerful sometimes to produce death.

4. *Testing* the durability and strength of material.

5. Fidelity in the discharge of *duty.*

6. *Self-sacrifice* to the death.

7. Development of cunning or wariness with *age.*

8. Capacity for *education*, for being tamed and taught.

9. Use of *mechanical principles* in the overcoming of difficulties or attainment of ends, as in the case of a cod that used a blast of air to propel a shelled mussel out of a basin, so that it might use it as food (Jesse).

10. Other forms of *adaptation* of means to ends, as in the case of eels driving prey for food by forming a circle round shoals of small fish, forcing them ashore (Jesse).

11. Detection of deceit.

12. Feelings of indignation or disgust, with their appropriate expression; expectation, anticipation or hope, joy, anxiety, confidence or fearlessness, fury, bloodthirstiness, gratitude.

13. Knowledge of *locality*, including boundaries.

14. Realisation of *consequences.*

15. *Change* or development *of character* with maturity—shyness or timidity giving way to courage.

16. The development of *suspiciousness*, which is apt, as in the higher Vertebrata, to become *morbid.*

17. Knowledge of and obedience to man's *signals.*

18. *Variation of behaviour* to friends, strangers, and foes (Houzeau).

19. Use of persuasion or *solicitation*, and address, in *courtship.*

Of the psychical character of the class *Amphibia* (or *Batrachia*) little can at present be said. So far as we yet know, there is not only no decided advance as compared

with the *Pisces*, but not the same variety or range of mental operations that are to be found among fish. The frog is best known to physiologists in its decapitated state, in connection with the *purposive actions* it exhibits, usually regarded as reflex, independent of volition, and not involving consciousness. In so far as these reflex actions—which are of the highest interest in relation to the basis of mind in plants and animals—are treated of in several other chapters, they need not be dwelt upon here. The frog, in its normal state, engages in trials of strength—that is, in *competition*—and it shows *disappointment* in being forestalled in food-capture, this disappointment being expressed by snappishness, literal and figurative. The toad *examines and tests* the size of crevices in walls in relation to the dimensions of its own body (Wood)—in other words, it takes *measurements*—makes *calculations*—of size and shape.

In the class *Reptilia* and order *Chelonia* the tortoise watches garden operations with interest; shows *antipathies* and predilections as to food; manifests discernment and uses precautions in the avoidance of danger; examines the means of escape from confinement; is restless and irritable in captivity (White and Jardine).

In the order *Ophidia* the mental characteristics of snakes or serpents are well known. Several of them become affectionate, docile, drawing-room pets—for instance, those of Chelsea described by Buckland. They were the playfellows of the children of the family; knew individuals; pined, by refusal of food, in absence of their master, kissing and embracing him on his return; enjoyed *fun*, and showed signs of pleasure and joy. Certain Indian snakes are called 'dancing' snakes from their delight in, and movements in concert with, music, displaying a knowledge of musical time, as well as of tone or tune. They are enticed or lured from their nests by music in the so-called process of snake-charming. Nichols ascribes to certain Australian snakes the repetition and improvement of *experiments*, or trials, which are at first unsuccessful. In illustration of the hereditary transmission and instinctive character of certain mental qualities, White describes menace and defiance as exhibited

by young English vipers removed by Cæsarean section from the abdomen of their mothers, and this though without fangs to carry their threats into execution.

Of the *Lacertilia* nothing can be said that has not been said of animals much lower in the zoological scale. Thus the *iguana* knows its master and his dogs, and answers its master's call (Nichols). But this recognition of the personality or individuality of other animal genera or of man —this understanding of and reply to man's signals occur even among the *Invertebrata*.

In the class *Aves*, or birds, we make another marked advance as regards psychical development. A great deal is known of their mental endowments, especially in regard to such birds as the parrot, starling, canary, and other cage or pet birds, the domestic fowl and other barn-yard birds, with various menagerie and game birds. So much, indeed, has been written in illustration of the instinct or intelligence of birds, that it must suffice here to summarise the leading psychical characteristics of birds as a class. Their mental aptitudes or acquirements, then, include—

1. *Articulate speech*, including conversation, declamation, and the power of appropriate remark and reply.

2. *Language* intelligible to man even when not articulate, including that of sound, voice, look, gesture, action—all as described in the chapters on 'Language:' by which language they make known to each other, or to man, their physical wants or needs, or their other desires.

3. *Fertility of resource*, including the trying of means and the selection of the best.

4. *Improvement* of dwellings.

5. Appreciation of domestic comfort (Carpenter).

6. Capacity for a high degree of *education*, especially in song and speech.

7. *Imitativeness* in a high degree, including ventriloquism.

8. *Humanity* to and sympathy with each other, in the form of feeding or cheering their captive fellows.

9. On the other hand, malicious joy sometimes in the sufferings of others.

10. *Foster-parentage*, including the voluntary assumption and faithful discharge of the duties of others.

11. Perpetration of *practical jokes*, and enjoyment of them.

12. Capacity for *deception*, including simulation, stratagem, decoy.

13. The performance of services useful to man, including fishing, fetching and carrying.

14. *Seeking assistance* from man, recognising his power, and assuming his willingness to protect.

15. *Punishment* of conjugal and other offences.

16. Holding of *assemblies* for specific purposes, implying a knowledge both of *time* and *place*.

17. Development of *dramatic* talent, involving the taking of different parts.

18. *Laws and order* of battle.

19. *Judicial trials* and other ceremonials.

20. *Pride* in personal appearance or beauty, in their voice, in the admiration they excite.

21. *Coquetry* in courtship—in the paying and accepting or refusing of love addresses.

22. Appreciation of the value of *amusement*, involving efforts by some individuals for the amusement of others.

23. *Æsthetic taste*, including the practice of decorative art and a knowledge of symmetry and effect.

24. Distinct *ideas of danger* and safety; taking the proper means of avoiding the one and securing the other.

25. Use of intentional *provocation* by way of insult, challenge, revenge, or punishment.

26. The use of *effort*, and, if necessary, of *repeated* effort.

27. Making *common cause* against common enemies, the cause of one becoming the cause of all.

But, in so large and important a class of animals as birds, there is very great variety in the relative intelligence of different orders, genera, species, and individuals. Houzeau arranges in the order of their intelligence—

1. The *Psittacidæ*,
2. The *Falconidæ*, and
3. The *Gallinaceæ*.

Undoubtedly the parrot is entitled to take first rank not

only because of its high general intelligence, but also because of its power of *speech*, whereby it can, intelligibly to man, express its ideas and feelings. In this respect, indeed, it ranks *next to man* himself, above the dog and the anthropoid apes. For similar reasons a prominent place must also be given to such birds as the starling and magpie, belonging to the *Insessores* or *Passeres*, the *Sturnidæ* and the *Corvidæ*. On the other hand, there are certain birds that have long enjoyed an unenviable reputation for *stupidity*—to wit, the booby, noddy, goose, and guillemot, all among the *Natatores*. Whether or how far they, in common with certain Mammals, deserve such a reputation is discussed in the chapters on 'Stupidity' and 'Reputation.'

Of the psychical characteristics of the leading types of all the chief orders of the *Mammalia* much has been written, and there is a superabundance of anecdotes illustrative of the sagacity of such animals as the dog, cat, horse, elephant, and, to a less extent, of certain apes and monkeys. As in the case of birds, however, in so large and important a class of animals, there is a great diversity in the degree of intelligence that characterises different orders, genera, species, and individuals.

The *diversity* of mental or moral endowments that characterises *individuals* of the same species is specially discussed in the chapter on 'Individuality.' Here we have mainly to do with the psychical characters of the larger divisions of the animal kingdom, of its subkingdoms, classes, and orders, and, to a minor extent, of genera and species. Among the Mammalia especially it is necessary to select genera and species for illustration, and to regard them as typical of the orders and classes to which they belong. It is impossible in the present work to analyse, for the purposes of comparison, the psychical character of all the important animals belonging to the Mammalia; but it is desirable to dwell shortly on the higher mental or moral aptitudes of one species—the dog, among the *Carnivora*—and of a group of the *Quadrumana*—the anthropoid apes.

The mental and moral qualities—the virtues and vices, the accomplishments—of the *dog* are referred to in almost every

chapter of this book, and are specially illustrated in such chapters as those on 'Education' and its results. And there are many mental aptitudes that it possesses in common with animals much lower in the zoological scale. To these I cannot here do more than allude. But it is desirable to point out specially the possession by the dog, or by certain dogs, of—

1. The *religious sense*, in so far as it includes, or is made up of *worship* of a superior being.

2. The *moral sense*, or conscience, in so far as it involves—

a. *Honesty*.

b. *Sense of duty* or trust.

c. *Sense of guilt* and shame.

d. Concealment of crime.

3. *Self-sacrifice*, even to the death—for instance, in the life-saving of other species or genera, including man.

4. *Service to man* in—

a. Begging, and so supporting man's life.

b. Watching or guarding life or property.

5. *Understanding man's language*, verbal and other, including the reading of human character and mood, the interpretation of facial expression.

6. *Use of money* and knowledge of the practice and principle of exchange or barter, of buying and selling.

7. *Self-control* in the restraint of natural and imperious appetites.

8. *Confederacy* or co-operation *with man*, both in useful service and in *crime*.

9. *Sensitiveness* to insult or affront, neglect, injustice, punishment, reproof.

10. Discovery of murders and murderers, lost or stolen property.

11. *Ideas of time*, tune, number, order, succession of events.

The mental endowments of the *anthropomorphous apes*, such as especially the chimpanzee and orang, are obviously correlated with their structure and habits; and a similar correlation is to be observed throughout the animal kingdom. Among the psychical characters of apes and monkeys—the

Quadrumana in general and the anthropoid apes in particular —are to be found the following:—

1. *Humanlike behaviour* at man's table, including the *use of man's food* and drink and of his *table utensils*—viz. cutlery, crockery, and glassware.

2. Humanlike conduct in human society, involving manners, or politeness, and gravity.

3. Humanlike action in the domestic service of man, including—

   a. Fruit- or leaf-collecting.
   b. Furnace attendance.
   c. Kitchen assistance.
   d. Door-waiting.
   e. Fetching and carrying.
   f. Nursing children.
   g. Message-going.

4. Humanlike use of their arms and fingers also in—

   a. Child-carrying.
   b. Pocket- and lock-picking.
   c. Face-washing in young.
   d. Vermin capture in each other.
   e. Driving horses in harness.
   f. Use of hoe and other farm implements.
   g. Fisticuffs.

5. Humanlike *use of tools and weapons*, both those which are natural, such as stones or sticks, and those which are fashioned by man, such as ropes or chains.

6. Humanlike use of *shelter and bedding*, of man's dwellings, beds or bedsteads, blankets or pillows.

7. *Love of finery* in dress among the females (Pierquin), and use of man's uniforms and dress by males.

8. Humanlike employment of signs or *signals* similar to man's, and for similar purposes, in the form especially of demonstrative or significant gestures.

9. Collection and *care of the wounded* (Houzeau) and dead.

10. Humanlike *sports* or games for self-amusement—*e.g.* hunting and riding.

11. Humanlike application of *tact*, patience, and perseverance in attaining an end.

12. Humanlike *musical accomplishments*—in instrumental music.

13. Humanlike *emotional language*, such as their war cry, and the language of abuse, reprimand, annoyance, joy, grief.

14. *Laughter and weeping*, kissing, caresses, and embraces, as expressions of emotion.

15. Use of *artificial intimidation* to compass an end.

16. *Government by chiefs* or leaders.

17. *Quarrels and reconciliations* with man and with each other.

18. The *storage of missiles* by way of ammunition.

19. *Reconnoitring.*

20. *Curiosity.*

It has for ages been subject of keen debate which of the lower animals stands *next to man* in intelligence, and there cannot be said to be anything like unanimity of opinion in the conclusion arrived at. On the whole, the place next to man, as respects both intellect and morals, is usually assigned to the *dog*—a rank that is undoubtedly due to his intimate association with and careful training by man for countless generations; for there can be no question as to the hereditary transmission, and consequent accumulation, of the results, good or bad, of education by, or mere imitation of, man.

Among the *Mammalia*, however, the dog has rivals in this supposed psychical pre-eminence in the *elephant*—belonging to the *Proboscidia*—on the one hand, and in the *anthropoid apes*—belonging to the *Quadrumana*—on the other; while among the *Aves* the *parrot* stands forth as unrivalled in the power of *articulate speech*, of conversation thereby, and of appropriate remark and reply. And even among the *Invertebrata*, as we have already seen, there are certain respects in which some authors give the place next to man to *ants*. Of them Wood says, 'Some of their performances are absolutely startling, so closely do they resemble the customs of human civilisation.'

In comparisons between different orders of the *Vertebrata* and *Invertebrata*, as regards the degree of intelligence they

possess, they do not all stand on equal footing, in so far as some animal genera, species, races, or individuals have been made the subject of *man's training for ages*, while others are known to us only in their wild or natural state. In particular the anthropoid apes, and the *Quadrumana* in general, are placed at this disadvantage—that their training, where training has been at all attempted, has been on a very limited scale, utterly insufficient to enable us to judge of the extent to which their intellectual and moral powers may be cultivated. There can be little doubt, I think, that when man bestows a careful training on certain of the *Quadrumana*, especially on those most closely resembling himself in size, structure, and habits—an education similar to that which he now gives to sporting dogs, race-horses, working elephants, and song birds—the mental and moral aptitudes of these apes and monkeys will be developed to an extent of which at present we have scarcely an idea; and when they have had the benefits of systematic and judicious education for ages—as the dog has had—apes and monkeys, in the persons of their higher representatives, may be expected to take the rank now so commonly conceded to the dog—of standing next to man in moral and intellectual power, as well as in aspect and structure.

With Houzeau, I regard the power of talking—the gift of articulate speech—as a possibility in the *Quadrumana*—one of the possible results of man's systematic efforts in their education. And the possession of such a power can scarcely be overrated in regard to the development of morals and intelligence. How far the two are correlated is seen in the parrot, on the one hand, and in the deaf-mute man on the other.

On the other hand, many animals are at a disadvantage *quoad* their *physical* organisation, in so far as it, being very different from that of man, and physical organisation being correlated with mental development or the degree of intelligence, the latter must necessarily differ from that of man. But the difference is less than might *à priori* be expected, in illustration whereof we have merely to consider the intelligence, on the one hand, as contrasted with the bodily organisation on the other, of the ant.

In such comparisons, in short, we must distinguish between high capacity and high development. There frequently is undeveloped or non-utilised capacity, though there cannot be development without capacity. Even in the dog, and still more in the *Quadrumana*, there is a moral potentiality or capacity yet remaining to be developed by man when he realises the importance, and the probable productiveness, of *moral education* in the lower animals.

The *mental scale*—the scale of intelligence, of moral development—is, so far as our present data enable us to judge, not quite synonymous with the *zoological scale*. The most intelligent or moral animals are not necessarily those nearest to man in the systems of classification commonly adopted by zoologists. Neither as regards the six subkingdoms of the animal kingdom, nor the classes of each subkingdom, nor the orders of each class, nor the subdivisions of each order, nor the genera of each order or subdivision, nor the species of each genus, can there be said to be any unbroken line of *continuity of psychical development*. In each subkingdom, class, order, genus, and species we find some one or more groups standing forth pre-eminently distinguished for their mental endowments, just as occurs in the races, breeds, and individuals of a species. The ant among the *Invertebrata*, the dog among the *Vertebrata*, appear to constitute remarkable breaks in, or exceptions to, the line of continuous or regular psychical evolution. But such breaks or exceptions may be much more apparent than real; and the progress of our knowledge in comparative psychology will probably render them less and less prominent.

Even as regards *man* himself it must be borne in mind that, as has been shown in other chapters, there are countless thousands—many whole races—that are intellectually and morally the *inferiors* of many well-trained Mammals, such as the chimpanzee, orang, dog, elephant, or horse; or birds, such as the parrot, starling, magpie, jackdaw, and various crows; as well as of many animals much lower in the zoological scale, and that are not trained by man at all, such as the ant, bee, and wasp.

Taking them one by one in the descending *series*, the *orders* of each class of the *Mammalia* that manifest the highest degree of intelligence are the—

1. *Bimana*—higher man only, however.
2. *Quadrumana*, especially the larger anthropoid apes.
3. *Carnivora*, including especially the dog and cat.
4. *Proboscidia*, especially the elephant.
5. *Ungulata*, especially the horse, mule, and ass.
6. *Rodentia*, especially the beaver and rat.

The other orders of the (7) *Monotremata*, (8) *Marsupialia*, (9) *Edentata*, (10) *Sirenia*, (11) *Cetacea*, (12) *Hyracoidea*, (13) *Cheiroptera*, and (14) *Insectivora* are not distinguished for intelligence, so far as we yet know, though some of them—for instance, the two last—rank in the mere zoological scale above all animals save the *Quadrumana* and *Bimana*. The *Insectivora* include moles, shrew mice, and hedgehogs; while the *Cheiroptera* consist of the bats—none of them comparable, as regards intelligence, with the dog, elephant, or other animals that rank lower in the artificial systems of the zoological classificator.

Hitherto we have considered the psychical characters of subkingdoms, classes, orders, genera, and species. But another—perhaps more convenient and interesting—mode of studying comparative psychology is to take some one mental faculty or aptitude and trace its progress either downwards or upwards. For instance, we may take up the moral sense as it is developed in civilised man, and trace downwards its modifications, until it disappears in lower or savage man, in the Quadrumana, the dog, and other animals. Or we can take memory, volition, emotion, thought, and trace their dawnings in plants and the lowest animals up to their highest developments in cultured man. Both plans should be followed by the student; both have been followed throughout this work, which contains abundance of data for a preliminary study at least of such a kind.

For instance, let us take up *obedience* to a human master's *orders*, with all that it implies—such as the understanding of one or more forms of man's language. We find this occuring as low down as among bees ('Percy Anecdotes') and

butterflies (Wood), fish—such as eels (Houzeau), cod, carp, gold-fish—serpents (Houzeau), and the toad (Wood). But the same performance or proceeding—the obeying of an order or command of man—obviously varies in its character and in the nature and number of mental powers involved. In order to *analyse* such an apparently simple performance, we must consider, on the one hand, the variety of man's orders, and on the other the various forms of, and motives for, obedience. In the lower classes of cases man's order is simply a call to be fed, and he may use a whistle or a bell, or peculiar voice-sounds of his own. This is common in the case of various tame fish, such as those of the Irrawaddy, described by Dr. John Anderson, of the Yunnan expeditions. In the higher class of cases man gives verbal orders, or a mere look or gesture suffices, and his dog undertakes complex and difficult commissions, which it executes with amazing promptitude and sagacity. In the lower class of cases there is usually an expectation to be fed, which is associated sometimes with a partiality for being caressed; while in the higher class of cases there is not unfrequently a sense of duty, a pleasure in giving gratification to man by the carrying out of his behests, without any immediate, or perhaps even ulterior, hope of reward, except that of a moral kind—the expression of human approbation.

CHAPTER VIII.

ANIMAL REPUTATION.

CERTAIN animals, like certain men, have *reputations*, based upon or connected with moral or intellectual qualities. These reputations are, as in man also, good or bad, deserved or undeserved, from which the animals to which they belong either derive advantage or suffer seriously. Reputation attaches itself either to the *individual*, as in the case of many dogs, cats, horses, and other domestic animals or home pets; or to the *species* or breed, as in the cat or dog, sheep, lion, tiger, camel, wolf, pig, mule, peacock, glutton, ox; or to the *genus*, as in the beaver, hyæna, toad; or to the *class*, family, or group, as in serpents, bees, wasps, bears, eagles, doves, or pigeons.

Individual animals—dogs, cats, horses, or elephants—have frequently a good reputation for honesty, docility, or other *virtues*, while others have as decidedly a bad one for theft, ferocity, or other *vices*. They may and do possess a good or a bad 'moral character' in the same sense in which such a term is applied to man. Such reputations are usually local and limited, known only to the possessor or custodian of the animal and his friends within a limited circuit or district. But in other cases a wider *fame* is acquired, either—

1. By reason of their own noteworthy exploits or feats, as in the case of 'Greyfriars' Bobby,' Lady Davies's paroquet, the dog Minos, the gorilla Pongo, and many other performing animals; or—

2. In connection with the lives and doings of their masters, who were or are historical, literary, or other celebrities—for instance, Sir Walter Scott's hounds, Byron's dog

Boatswain, Cowper's hares, Poe's and Dickens's ravens, Caligula's horse.

And, just as in man, fame in such cases becomes the subject of verse or story, and is rendered permanent and *classical.* Certain animals acquire *celebrity*; their achievements, their virtues, their mere companionship it may be, are recorded in pages that mankind will not willingly let die.

Man, however, is only too apt to form an *erroneous idea* of animal character, and it is on this erroneous, popular, frequently merely poetical, ideal that he bases his comparisons between human and animal character, and bases also certain *epithets* applied to himself. He regards certain animals as the incarnation or embodiment of certain moral or mental qualities that in himself constitute virtues or vices, and hence he makes use of the names of the animals in question, in popular as well as figurative language, as *emblems* of the said virtues or vices.

The difference or divergence between the *real and the ideal* character varies considerably. While certain animals, like certain men, possess and enjoy a much better reputation than they deserve, others suffer from a much worse one than the reality exhibits.

Thus man ascribes to the following animals the following qualities, or he adopts them as the emblems, types, or representatives of the following qualities or conditions in himself and his personal relationships:—

1. Lion.	Majesty of demeanour, dignity of character, bravery.
2. Tiger.	Ferocity, bloodthirstiness, untamability.
3. Hyæna.	Ferocity, uncontrollable restlessness.
4. Wolf.	Ferocity, rapacity.
5. Bear.	Ferocity, bloodthirstiness, awkwardness, roughness.
6. Cat.	Spitefulness, selfishness, cold cruelty, stealthiness, treachery, attachment to place and not to person.

7. Dogs, or certain breeds thereof, such as the bull-dog.	Stupidity, ferocity, blood-thirstiness, pertinacity, quarrelsomeness or pugnacity, servile fidelity or obsequiousness, want of all affectionateness.
8. 'Cat and dog' companionships.	Domestic broils, connubial unhappiness.
9. Hare.	Timidity, recklessness or rashness.
10. Beaver.	Industry, pugnacity.
11. Glutton.	Voracity.
12. Ox.	Stupidity, stolidity or apathy, meekness or uncomplaining patience.
13. Mule.	Stupidity, perverseness.
14. Dove.	Innocence or guilelessness, gentleness, connubial love and fidelity.
15. Eagle.	Nobility of mien and character, magnanimity, boldness.
16. Peacock.	Personal pride or vanity.
17. Bee.	Industry, orderliness, constructive skill.
18. Wasp.	Irritability of temper.

We hear a great deal of the *lion* as the 'king of beasts' and of its alleged bravery. It figures on the coat of arms of England as the emblem of power and dignity, of all apparently that is good and great. But African travellers and sportsmen have exposed the pretensions of the lion, describing cowardice as its true character rather than courage. The Rev. Professor Haughton, of Trinity College, Dublin, says the lion is a 'pretentious humbug, and owes his reputation to his imposing mane. He will run away like a whipped cur under circumstances in which the tiger will boldly attack and kill.' It is not, however, without redeeming qualities. Thus we are told of the occasional attachments of the lion or lioness, or their cubs, to man or child, becoming their com-

panions both in sleep and play, expressing their fondness by fawning or caressing. They are equally affectionate to their own young (Watson, 'Percy Anecdotes').

The ideas man generally associates with the *tiger* are ferocious courage, bloodthirstiness, untamability; but, according to Jamrach, the well-known wild animal dealer of London, it is sometimes at least timid or easily frightened. It can be tamed if taken young, and then forms harmless companionships with dogs or other animals. When not hungry it is 'frightened at the least noise.' An escaped tiger in the streets of Calcutta, meeting a steam roller, became at once so frightened that he 'turned short round, ran back the same way, and finding the door of a house open, ran in . . . . sprang over a table at which four people were sitting at breakfast, out at the back door, and into the kitchen, where he sat down in a corner,' from which he was after a time decoyed by the bait of a live kid.

Tiger cubs are sometimes in India brought up with other young animals, especially the common Indian jackal, so as not to attack them. Such cubs become pets on shipboard and elsewhere, forming close companionships with other animals, such as the dog. We are told of a tamed tiger, that it played with everyone on board a certain ship, and that it formed a great friendship for and with a dog. The mature, wild, powerful tiger possesses and exhibits certain moral qualities that are considered admirable when they occur in man; for instance, it shows a wonderful magnanimity sometimes in the case of an adversary that displays pluck, spirit, courage, manifesting its respect or deference not only by sparing its life when completely in its power, but even by contracting an attachment for it, taking it under its protection, and, in short, making a companion of it. All this has been done by a tiger towards a dog that stood up to it in the fight, to the tiger's obvious amazement, followed by its admiration (Watson, Wood).

The tamability and tractability of the tiger are shown by the fact that Indian fakirs travel about the country with tame tigers, 'which they simply lead with a slight string, and which will allow themselves to be caressed by the hands

of children' (Wood). The tiger shows considerable intelligence or ingenuity in its mode of catching monkeys, giving the tree on which they are perched an unexpected shake.

Next to the tiger the common *hyæna* bears the most decided reputation in the popular mind for ferocity. In captivity it is the fancied embodiment of unrest; it is regarded as incapable of domestication, as the most unpromising subject for conversion into a pet. One of the hyænas is called the 'laughing' hyæna, but its laughter is supposed to be of the kind that we call 'fiendish,' and ascribe to the typical demons of operas. Nevertheless the hyæna may be trained to act in place of a watch dog; it becomes attached to man, and is sensitive to kindness (Baird). And there are few, if any, of the higher animals of which the same may not be said—viz. that they may be tamed, and will repay man's efforts in their training or tuition. All that is usually required is to begin their education with the earliest stages of their growth—to remove them from their natural surroundings while they are yet quite *young*—if possible, when new-born—and to treat them with a prevailing kindness—to bring them up in an atmosphere of sympathy.

We are not accustomed to think of the *wolf* unless in connection with incorrigible or untamable ferocity, voracity, rapacity, and bloodthirstiness; and yet various authors describe it as capable of being tamed, as being affectionate and emotional, moved equally by joy and sorrow. Frederick Cuvier gives the case of a tame one that was as tractable as a dog, and as fond of its master, drooping in his absence and making 'demonstrations of delight' on his return, 'planting its fore feet on his shoulders and licking his face.' Such companionships, with all the affection they embody or illustrate, must be borne in mind in judging of the probable verity or authenticity of various current stories of the upbringing by Indian wolves of human children.

When we speak of a man being 'a bear,' we usually mean that he is all that is gruff and rough, uncouth, unpolished, unfeeling; and we, moreover, regard the animal itself as stupid, callous, cold, and cruel. In reality, however,

the Arctic or Polar bear—that with which we are most familiar by name—is intelligent, ingenious, active, energetic affectionate, emotional, playful, companionable, and tractable. It is capable of generosity, of self-devotion or self-sacrifice for or with its young, and it exhibits caution in the avoidance of snares.

Bear whelps frequently become not only amusing but harmless playfellows of children. Of a military bear pet we are told that it played at 'hide and seek' with the band boys, wrestled or boxed with the men, standing on its hind legs, and all in perfect good temper ('Chambers's Journal'). There is, in fact, a rarity of bad humour, of any loss of temper, in bear whelps brought up with children. Even teasing by the latter is borne with wonderful equanimity (Cassell). In some cases a decided affection is contracted for some child companion, whom the bear cub may even feed, protect, and caress ('Percy Anecdotes'). They may be trained to sit at table and to behave becomingly, so far as their ungainly structure for such a purpose will admit. Tamed bears or bear whelps also mess amicably with cats, dogs, and birds as well as with children (Cassell). The solicitude of the mother bear for her cubs is notorious to Arctic travellers. She is even demonstrative in her affection—for instance, when they are wounded (Houzeau).

The bear displays, moreover, conspicuous sagacity and ingenuity in its mode of killing the walrus. It is no peculiarity of the Arctic bear that it is sometimes unhappy, sullen, angry, revengeful; but it is under the influence of man's persecution of or cruelty to their cubs, rather than themselves, that such moral or mental qualities or conditions are developed.

The poor *cat* has probably been as much maligned and misunderstood or misappreciated as it has been petted. We are told that its apparent affection is only a 'cupboard love;' and this cupboard love is popularly supposed sufficient to account for its propensity to pilfer eatables and drinkables. It is said to be attached to places, not to persons, to stick to some given house even when a master or mistress who has lavished kindness upon it has had occasion to change

quarters. Absurd stories are told as to its sucking children's breath.

We speak of a scandal-propagating, unamiable, sour old maid as being 'spiteful as a cat,' and we associate the so frequently beautiful animal with ideas of stealthiness and treachery, of the enjoyment of the torture of its captives, of calculating cruelty. And yet Wood tells us, 'Instead of being a greedy, selfish animal . . . . it is really a very unselfish and generous one, capable of great self-sacrifice.' Jesse mentions one that fed a jay twice a day with mice. Another cat always brought and laid at her master's feet the mice she had caught before she would eat them; she made use of them as food only when they were given back to her by her master. The attachment of the cat is frequently as great to person as to place, such attachment, however, depending usually on how far she is understood, sympathised with, and kindly treated. Cases have been given of cats following their masters from house to house, place to place, accompanying them on visits to other people's residences as unconcernedly as the dog (Wood, Broderip). They may be trained even to guard and defend like a dog.

In the East '*dog*' is a term of profoundest contempt used by man towards his brother man; and in many parts of the East, where the poor animal is either utterly neglected or cruelly ill-used, or both, it possesses many evil qualities that are not developed in happier circumstances. In our own country we use the term 'dogged' in a contemptuous sense, usually as synonymous with a stupid, hopeless obstinacy. But such self-willedness or perversity is no more a feature of the natural character of the dog than it is that of the ass, mule, or pig. When it really exists, it is usually the fruit of man's training or usage (Walsh).

In the *bull-dog*, for instance, there is a remarkable tenacity or pertinacity of purpose, this purpose being the 'holding on' through thick and thin, even to the death, to an enemy. Blaine tells us that 'no sufferings short of extinction can make him forego his purpose,' whether it be a right or a wrong one. But this is a direct result of man's training; and what we call, with singular impropriety, its

'brutal nature' 'is mainly attributable to the savage human beings with whom he associates,' says Walsh, and no doubt quite correctly. This sort of obstinacy and ferocity is considered among the animal's greatest virtues.

Among dogs there is none in such evil odour as the bull-dog, which is popularly supposed to be 'utterly incapable of anything but ferocity and combat'—an incarnation of stupidity, of want of natural affection, of quarrelsomeness or irritability, of a bloodthirstiness rivalling that of the lion, tiger, hyæna, or wolf. But Webb, Jesse, Walsh, Blaine, and other writers show how unfounded is such a belief. Under favourable circumstances he becomes, or may become, intelligent, faithful, companionable, good-tempered; he may even be taught tricks or feats like those performed by the poodle or other dogs; he may show attachment to his master. Jesse even describes one that died of grief on being transferred to another owner. He has saved human life, for instance, by carrying a rope ashore from a shipwrecked vessel, though he is not a water dog, and might be excused for refusing to take to water at all even when smooth and quiet. He is, moreover, an 'excellent watch, and as a guard unequalled,' according to Walsh. Fearlessness and fortitude are also good qualities that cannot be denied to him.

As in man himself, there may be a singular co-existence of good and bad qualities. Thus we are told of a bull-dog so ferocious as to bite its own mistress, that yet tended gently a wounded kitten deserted by its own mother (Wood).

When we speak of one man 'dogging' another's steps, we do not refer generally, or at all, to mere faithful and close following by a person who would prove a defender or protector in case of need, but to some spy or assassin—some follower whose purpose is nefarious or dishonourable. Nor, when we say that one man 'hounds' on another to this or that action, do we allude to the legitimate barking of or chasing at the sheep by the collie, or at or of the hare by the harrier. We use the term, as we do the others, in a bad sense. The object of the 'hounding' in man is usually revenge or crime.

Again, we borrow the term 'snappishness' from the dog—not referring to the mere snapping at imaginary or real insect tormentors, or at man interfering with its rightful property—a bone—or deliberately provoking it by blows, kicks, or otherwise. When we talk of a man or his temper being 'snappish,' we refer to a kind of irritability—shortness of temper—that is much commoner in man than in the dog, and which, when it occurs in the latter animal, is usually at least produced by man's own provocation or bad usage.

One of the commonest and most serious, and at the same time most undeserved, of the evil epithets or reputations attached to the dog in this country is that of 'madness,' by which is popularly meant rabies. The well-known proverb, 'Give a dog a bad name, and you may as well hang him,' probably arose in connection with its supposed liability to rabies. Whether this be the case or not the proverb is specially applicable to, and true of, these our own times; for while I am writing these pages the newspapers tell me that no less than 1,200 dogs have been captured within a few days in the streets of Glasgow, and destroyed wholesale by drowning, while the survivors are ordered to be muzzled, all because three fatal cases of supposed human hydrophobia have recently occurred in the infirmary of that city. As the real character of this reputed 'madness' is discussed in another chapter, I must not, however, further allude to it here.

When a husband and wife fall out, when domestic unhappiness pervades a dwelling in which connubial bliss should tincture all things, when mutual bickerings and recriminations are substituted for mutual affection and respect, when angry words lead to angry blows instead of the loving, and cherishing, and obeying that ought to characterise the relationship of human marriage—we speak of such ill-matched and ill-starred spouses as leading 'a *cat and dog* life.' And it is quite possible that cats and dogs, under certain unfavourable circumstances, may and do have their quarrels. They may both figuratively and literally be 'set by the ears.' It would be singular if they were not. But here, again, their

quarrels and fights, when they do occur, are too frequently the direct result of *man's intervention*, of his cruel propensity for what he calls 'sport,' though cases occasionally occur also in which a practical—perhaps malicious—animal joker, such as the parrot, produces and enjoys the same effect. When left alone, cats and dogs, so far from quarrelling with each other, contract the closest companionships or friendships, characterised by the strongest reciprocal affection.

Take a single suggestive case from 'Nature.' As puppy and kitten a mastiff and a cat had contracted so strong a liking for each other that the latter voluntarily took up her residence in his kennel. She 'never seemed happy' when away from him. 'She ate her breakfast out of the dog's bowl, and slept in his kennel with his paws around her. She used to catch mice and young rats and carry them to him, and seemed quite pleased when he accepted friendship's offering.' She duly made his kennel her accouchement chamber and nursery, while he became nurse to her progeny in her frequent absences. 'Cato,' we are told, was 'quite proud of his charge.' Her only surviving kitten in course of time became as fond of the dog as its mother had been. It, too, 'brings mice, young rats, and rabbits, and lays them' before him, looking 'beseechingly till he takes them. She constantly plays with him, and gets on her hind legs to look fondly into his face, while he puts his paws round her, as he used to do to her mother.'

Here one of the most interesting and suggestive features is the apparent *hereditary transmission* of fondness for an animal that is so generally looked upon by man as the cat's natural enemy. Dogs and cats, especially when both are young, are indeed common playfellows, as I have myself seen over and over again in many a household. The alleged mutual antipathy, and consequent quarrelling, of the dog and cat are, therefore, one of man's many fables, fictions, or popular delusions concerning other animals. Many instances of sympathy between the dog and the cat, of good offices performed by the one towards the other—most frequently by the dog towards the cat—and of the effects produced on the whole character of the one by the other

when companionship hos been long and intimate, are cited by Wood and other authors.

The timidity of the common *hare* is so proverbial that it derives its specific name, *timidus*, from this mental peculiarity. Nevertheless it sometimes shows fearlessness of dogs, and even commits rash assaults upon them, or romps with dog companions (Cassell). It also becomes a house pet, showing great attachment to a master, as in the well-known case of the poet Cowper. Shakespeare is not the only person who has spoken of certain kinds of men as being 'hare-brained,' and to this day we constantly hear of this or that person being as 'mad as a March hare.' There is no good ground, in the cerebral or psychical organisation or character of the hare, for a comparison so damaging to the good name of the poor animal. The terms are apparently applied to people possessed of the most fanciful and impracticable projects; but why such vagaries should be connected with the name of so useful and harmless a creature I confess myself utterly at a loss to understand or explain.

Unlike the hare, the *beaver* is one of the animals whose reputation is *better* than its real character warrants. It is popularly supposed to be intelligent and industrious in the highest degree; but in the first place Gillmore describes it as lazy, and we know that its constructive 'instinct' is singularly fallible.

The wary wolverene, or *glutton*, is believed to be so voracious that 'gluttony' has become a by-word for—a synonym of—inordinate appetite—greed to the extent of gorging—in man or child; but there is no reason for supposing that the wolverene is more voracious than many other animals that are closely hunted by man, that are often pressed with hunger, and that are compelled by the exigencies of their existence to gorge themselves with food when fitting opportunity occurs. Savage man himself does the same, and both in his case and in that of the wolverene there is, or may be, proper excuse. But the gluttony of civilised man, or of his pampered, over-indulged child, is something very different. Here again the epithet borrowed from the name of one of the lower animals is *perverted* in its use or application, and

what is simply in the one the necessary satiation of appetite with suitable food is in the other unnecessary and dangerous repletion with substances, solid and fluid, that too frequently are not entitled to the appellation of 'food' at all.

The useful *oxen*, our domestic *cattle*, do not get credit for other psychical qualities than those that are virtually of a negative or passive kind; but what they may become under proper training and kindly usage is, or was at one time, illustrated by the condition and aptitudes of Hottentot oxen. Whatever they may be now, they used to be trained to fight for and to pay respect to man, to guard and defend his flocks, so as to be employed instead of watch dogs; to understand his signals and obey his commands; to distinguish, as well as the different inhabitants of a kraal, friend or familiar from foe or stranger, and to attack the latter (Watson).

When we speak of a man being 'stubborn as a *mule*,' we little think that this stubbornness, when it exists in the animal, is usually the result, direct or indirect, of man's injudicious or bad usage. Nor do we give the animal credit for the sagacity or shrewdness, the vanity or pride, which it possesses. Nevertheless it is humiliating to man's self-esteem to consider how conspicuously the mule shows its superior sagacity in certain circumstances. Many a traveller in Alpine countries, if he has not himself been both stupid and stubborn, has been thankful to trust himself implicitly to his mule and its guidance in way-finding or way-keeping on unknown or dangerous ground. Few animals are more intelligent than the mule in the means whereby, in Central America, they avoid being lassoed by their masters (Wood). It is one of man's delusions regarding this useful and frequently beautiful animal that, like its relative the ass, it is of an humble or meek, all-suffering spirit. In point of fact, however, the mule is 'a very proud animal and fond of good society,' and in Central America it shows both in its partiality to the horse and aversion to the ass (Wood). Like many men, it apparently despises its 'poor relation' the donkey, while it glories in its kinship with the horse. On the other hand, it is said that the vanity

of the donkey as regards its relationship to the mule leads it to dangerous obtrusiveness on its proud relative (Wood).

The *rat* is universally denounced as mere vermin, to be ruthlessly exterminated by all possible means—terriers, ferrets, or poison. It is known, moreover, as an incorrigible thief and hoarder of stolen goods. But no credit is given to it for its undoubted good qualities. Rats, however, show a 'thoughtful tenderness for each other that may well put Christians to the blush,' says the 'Christian Union,' an American newspaper, that vouches for the truth of the following incident, quoted in the 'Animal World:'—A young rat had fallen into a pail of pig-food. Six older ones held a consultation so earnest in its character as to lead them to ignore the presence of human onlookers. They decided on an ingenious scheme of rescue, and successfully carried it out. Entwining their legs together, they formed a chain hanging downwards over the edge of the pail. The foremost or downmost rat grasped the drowning—and, as it subsequently proved, drowned—young one in its fore paws, and both rescued and rescuer were then drawn up and out. When found to be dead, the rescuers gazed at their young comrade in 'mute despair . . . . wiped the tears from their eyes with their fore paws, and departed without making any attempts to resuscitate it.'

There is apparently no good ground for belief in the alleged malignity of *reptiles* (Baird). That the 'venomousness,' figurative or literal, the torpor, mental and bodily, the non-intelligence or stupidity, or the absence of affection, of *snakes* (or serpents) do not hold good in the case of many of them is proved by the account given by Buckland of the tame snakes of Chelsea, that some years ago created such a sensation in the London newspapers. He pointed out that, so far from being dangerous, the animals in question were amiable, innocent, amusing house pets; and he properly drew attention to this illustration of what *kindness* can do in the domestication of the most unlikely animals. Like so many other animals, they act on the offensive only when frightened, threatened, or provoked; and if and when they are dangerous to man, he himself is too frequently to blame for the injury inflicted.

Even more loathed than the serpent, an animal that inspires in most men a feeling of intense disgust is the *toad*. Nevertheless, Jesse assures us, 'everything about a toad is worthy of our attention—all that he is and all that he does.' It affords aid to its maimed brother; and if it does not wear outwardly, as is alleged by fancy and fiction, 'a jewel in its head,' it shows certain excellencies of moral or intellectual character ('Percy Anecdotes').

The *hedgehog* is usually regarded as a mere animate ball, a thing for boys to pelt; but it is tamable, becoming quite domestic (Baird); acquires a familiarity with persons, distinguishes them by their voices or otherwise, and answers their calls (Jardine).

The *dove*, with its olive branch, is regarded as the emblem of peace and innocence. The philosopher is made to say—

> In parental care and nuptial love
> I know my duties from the dove.

We liken the course of 'true love' to the 'billing and cooing' of the pigeon, and popular imagination finds it almost impossible to conceive anything unamiable as attachable to the dove or pigeon. Nevertheless the *facts* are these:—White tells us of the fieriness or ferocity of certain young ones—of their general wildness of demeanour being such as to frighten their foster-mothers and prevent their being fed, and so of their dying of starvation. Other authors describe the *male* dove as a regular libertine, instead of a pattern of marital or conjugal affection and constancy.

Watson gives the case of a *female* deserting her mate; of the return of the faithless partner, who was refused re-admission to marital favour; of the use of her arts and efforts to regain the lost regard, to revive the conjugal affection of the justly offended spouse; of her importunity, ending in her at last forcing her way into the nest, her old home; of her death, probably from disappointment at the failure of all her attempts at restitution to her old place in her husband's affections; and then, and not till then, of the remarriage or re-mating of the widower. He also cites an instance of a female deserting a mate forced on her, and his young, to return to her 'first love.' So that the character

of the dove is neither so good as represented by poets nor so bad as depicted by certain other—perhaps cynical—writers.

The *eagle* figures as the emblem of all that is majestic on the national coats of arms of America, Russia, Austria, Prussia, and other nations; it was an emblem of dignity also among the Romans; and no doubt it has frequently, in confinement, a certain dignity of mere look; but, like the lion, it is far from being the brave, bold bird it is generally supposed to be. Franklin himself points out that the real characteristics of the American eagle are cowardice, dishonesty, injustice, sharping and robbery, or other forms of bad morals. Other authors regard eagles, like *ravens*, as 'types of all that is violent, dark, and cunning.' But here again their moral character is not altogether bad, for we are told that eagles are really paragons of 'as sincere conjugal love [or fidelity] as [is to be found] among monogamous mankind' (Wood).

The beautiful *peacock* is the emblem of man's consequentiality and self-complacency, vanity or pride, using these terms in their contemptuous or worst sense; but we have no proof that its peculiar strut, or the spread of its gorgeous tail, arises from what Darwin calls 'conscious vanity.' That it does so arise is merely *man's interpretation* of the phenomenon; and man is particularly liable to error in the construction he puts upon the motives of action in other animals, or even in other individuals than himself. As is pointed out in the chapter on 'Courtship and Marriage,' the peacock is one of many male birds that possess personal charms, that have a knowledge of this possession and its advantage in the eyes of the female, and that display these charms to the greatest advantage. But all this does not involve pride or vanity in the offensive sense in which man so frequently applies these terms—for instance, to frivolous woman.

Few animals have been so highly esteemed by man as the 'little busy *bee*' of Dr. Watts. The supposed perfection of its 'instinct' we never dream of connecting with ideas of possible error, stupidity, confusion, temper, or idleness.

Nevertheless it is pointed out in other chapters how it commits mistakes and exhibits stupidity—for instance, in constructive skill and in way-finding to its own hive—and we might record against it many other defects of character, mental or moral. Huber tells us that bees are directed by their queen, and if she is lost, they return to their hive incapable of any kind of reorganisation. They are, moreover, liable to mental confusion, to panic, to what has been variously described as a sort of temporary epidemic excitement, delirium, or mania, in or prior to swarming. Agitation, disorder, aimless movements, general tumult, occur; there is forgetfulness of their ordinary work or duty; nurses become inattentive; the guard deserts, and even assaults or insults the queen. Again Lubbock has quite recently shown that bees are characterised by a certain kind or degree of stupidity, a lack of ready observation, even when their own personal interests are concerned—in regard, for instance, to the discovery of honey.

On the other hand, the *wasp* suffers from an evil reputation it does not deserve. Homer, in his 'Iliad,' book xxi., addresses the

> Wasp! front of impudence, and past all bounds audacious;

and from the earliest ages to the present day it has been regarded as the type of everything in the human character that is acrid, ill-natured, spiteful, revengeful. Hence we speak of the 'waspishness' of an irritable, unamiable man, whose society is to be avoided. But, so far from being a sort of insect Ishmael, ready with its sting on all occasions, for the benefit or injury of friend and foe alike, the wasp is one of those apparently unpromising animals that will respond to and repay man's kindness and attention by becoming both tractable and affectionate.

Sir John Lubbock has shown us that the wasp, or certain wasps, can be tamed by a little trouble on man's part. No credit, moreover, is popularly given to it for its skill and perseverance as a paper-maker and nest-builder, for its division of labour and system of promotion (Ormerod), for the energy and adroitness with which it hunts its prey, for its desperate

courage, or for its tenderness in nursing. Its domestic life is characterised by order and quiet, by cleanliness, by care for the young. There is an atmosphere of good understanding in the community; its members co-operate harmoniously for common ends; there is a rarity of quarrels among themselves. They are models of industry—for instance, the sand wasp (Baird). They display considerable artistic fancy (Figuier); their nest is a sort of town, displaying symmetry or regularity in its dwellings, streets, and walls (Réaumur).

To say that the wasp is faultless—that it is free from vices while abounding in virtues—would be to say what is not true—would be to assert that it is a singular exception to the general rule that the character of all animals is made up of various *combinations of both vices and virtues*. The wasp has warlike propensities, and its pugnacity is sometimes a marked feature. It is, or may appear to be, excitable, irritable, even savage; it gets out of temper or into bad temper. But it is fair to the insect's true character to say, in this as in so many other cases, that this bad temper or other similar vices, where they occur, are frequently in great measure or altogether due to the provocation to which the wasp is subjected—occasionally or habitually—*from man*.

We have seen, then, that in a great many cases *man* is really to blame; he is morally responsible for the evil reputation which he attaches to the lower animals. If only he give them fair play, they will show themselves in their real, not in their fictitious, characters. It is proper, however, on man's behalf, here shortly to advert to the fact that he occasionally, though not often, suffers in reputation from the misdeeds of other animals. Many a poor servant girl, for instance, has been suspected of, charged with, or punished for a theft of coin, jewellery, plate, or cutlery that was really perpetrated by some roguish rat or pet bird. In the chapter on 'Crime and Criminality' it is shown how many animals are arrant *thieves*; how they hoard their stolen goods, and how ingeniously and successfully they conceal the evidences and results of their crime. And there is this parallelism between the responsibility of man and that of the lower animals for the undeserved evil reputation fixed upon

UNIVERSITY OF MICHIGAN

the other, that in neither case, generally speaking, is there any desire or intention of committing an injustice. Man and other animals sin in *ignorance* of the results of their sin. The rat or the magpie does not usually steal in order that some poor girl may be blamed and punished for the supposed theft by her of a spoon or ring. I say *usually*, for parrots and other birds play jokes of such a kind for the purpose sometimes of annoying their human foes, quite well knowing that they are annoying them, and enjoying the evidences or fruits of their annoyance. In the same way man, when he habitually neglects or maltreats a donkey, is for the most part ignorant that the stubbornness with which he fancies he is dealing—if present at all—is the natural fruit of his own behaviour. He sins in thoughtlessness, perhaps from incapacity to understand or appreciate the connection between cause and effect in the determination of character in subject animals by the circumstances in which they are placed.

CHAPTER IX.

ALLEGED PSYCHICAL DIFFERENCES BETWEEN MAN AND OTHER ANIMALS.

It is, and has for ages been, popularly believed that there exist certain fundamental psychical or other *differences* between man, on the one hand, and all other or lower animals on the other. There are, it is alleged, certain mental or other attributes which are distinctively or peculiarly *human*, absolutely confined to and characteristic of man, and which constitute therefore fixed and demonstrable points of differentiation between him and other animals. Some of these supposed exclusive prerogatives of man are *physical*; but the physical are so blended with the mental that in such a review of them as the present it is desirable not to separate them. The differences in question are, however, so numerous that it is equally impossible and unnecessary to analyse or discuss all of them here. And, moreover, some are of such a character that it could serve no good end to do more than refer to them *en passant* as being mere verbal distinctions—mere ingenious refinements of men determined by any means to prevent the occupation by other animals of the same moral or mental platform as man. It is proper, nevertheless, to give specimens of the different kinds of objections that have been raised—mainly by the prejudice of man—against granting to the lower animals a moral or mental status at all approaching that of the vain lords of the creation. Let us, then, enumerate the leading differences that have been supposed to distinguish man from what he contemptuously calls 'the brute;' and in doing so let us determine for ourselves how far the objections taken are real or substantial.

The chief alleged distinctive psychical or other attributes of man as compared with lower animals are, or include, the following:—

1. It is alleged at the very outset that the possession of a *soul* or spirit places man on a platform by himself. I have already explained (in the Introduction) my reasons for not discussing, in the present volume, the subject of soul and its immortality in the lower animals. In so far as soul is to be held to be that part of man's nature which is destined to exist in a future, any discussion of the question whether such an attribute pertains to other animals must be *purely speculative*, and unsuitable therefore in a work which professes to deal only with the facts of observation, and with scientific or logical inferences from these facts. In man himself the existence of soul, with the probability or certainty of its immortality, is a matter of faith or belief, not of scientific demonstration. By no kind of scientific evidence can it be *proved* that soul exists, whether in man or other animals. And as regards belief and hope, there are, and have been, many eminent authors, including divines or theologians themselves, who have expressed their opinion that certain other animals, such as dogs, may have souls, which may further be *immortal*, just as is man's. No man is, therefore in a position to assert absolutely that the presence or absence of a soul characterises either man or other animals. Nor should it be forgotten that, according to many writers, the word or term 'soul' is regarded as synonymous with 'mind;' in which case there can be no question as to its possession by the higher animals; while the term 'soul' has also been applied—in figurative senses no doubt—even to *plants*. It obviously lies with those who assert dogmatically that all men have immortal souls, while no animals possess them, to reconcile with such a conviction the provable fact that many animals are superior to many men, not only in general intelligence, but as regards also moral sense and religious feeling.

2. The subject of *immortality* — the knowledge of or belief in a future destiny or state of existence—is inseparably connected with the question of soul. Now, in the

first place, it is desirable to bear in mind how differently the matter of immortality is viewed at the present day by men of the highest scientific culture. We are told in one of the most recent expressions[1] of scientific opinion regarding human religion—and especially regarding the peculiar tenets of the Christian religion—that some scientific men, 'professing themselves unable to conceive such an existence as a disembodied spirit . . . . are forced to conclude, like Priestley, that the soul in its nature is not immortal . . . . believing, with Priestley and others, that immortality is a fresh and miraculous gift conferred upon man at the Resurrection; another [section of scientific men] unable to conceive the possibility of a miracle in the case of each individual, denying a future state altogether; while a third section maintains that there is no use in discussing the subject, because man after death has passed beyond the sphere of human enquiry.' Nor can it be pretended that a knowledge of a future existence, that anticipations of a future state, that ideas of immortality, are common to all men. There are, indeed, no means of either proving or disproving that such hopes or beliefs exist, on the one hand, in all men, or do not exist, on the other hand, in other animals or certain of them. It is, at all events, absurd to assert that other animals live only in and for *the present*. The whole phenomena of *foresight*, hope, expectation, contradict emphatically any such averment. The statement that they live in and for the present only may indeed be made much more really or truly of many men, perhaps the majority. This subject is also touched upon in the chapters on 'The Religious Sentiment in Lower Man and the Higher Animals.'

3. Sense of *religion*, religious belief and ceremonies, ideas of *God*, the worship of a *deity*. Even among men of the highest scientific culture there are those who 'have maintained that we have no evidence of any such Being'[2] as the God of the Christian; while in other chapters it is shown that whole races of lower man have no ideas of any sort of divinity, no kind of worship, no religious feeling.

[1] 'Unseen Universe,' pp. 34–5. [2] 'Unseen Universe,' p. 35.

On the other hand, it will be seen that certain animals may, with perfect propriety, be said to have a kind or degree of religious feeling, including the recognition and worship of a god in the person of man, or of idols in the form of fetiches.

4. *Moral sense*, including ideas of good and evil, the sentiment of justice, conscience, sense of decency. But, as has been shown by Büchner, Houzeau, and others, notions of good and evil do not exist among all men. In other chapters it is pointed out that ideas of justice or right, that feelings of decency or shame, that that combination or essence of moral qualities known as *conscience*, are as certainly present in certain animals as they appear to be absent in countless numbers of men.

5. *Self-consciousness.* The distinction drawn by metaphysicians between consciousness and self-consciousness is too refined for practical purposes. Whatever self-consciousness may be, if it can be proved to be absent in the lower animals the probability is that, like so many presumably peculiar human attributes, it is equally wanting in whole races of man. According to Max Müller, the assertion as to self-consciousness is 'either right or wrong according to the *definition* of the word;' and the same may be remarked of almost every one of the alleged moral or mental distinctions between man and other animals. Miss Cobbe and other authors hold that self-consciousness is necessarily associated with moral responsibility and abstract ideas, both of which are attributes of certain of the higher animals. Professor Huxley, too, apparently denies that self-consciousnesss is a good distinction, or a distinction at all. 'By perceiving objects as external, they [the lower animals] practically recognise the difference between the self and the not self.' The supposed distinction of self-consciousness was first pointed out by the schoolmen of the Middle Ages. Bayle, however, argues against it (Wardrop). Among its leading modern upholders was the late Professor Goodsir, of Edinburgh, but his definition of ordinary consciousness as *instinctive* in animals and *rational* in man is based on an utterly untenable distinction.

6. *Potentiality.* Much is made—a great deal too much

—of what is called the moral or mental potentiality of man. It is alleged that, however abject and degraded man is, he nevertheless has certain *latent* powers or capacities not possessed by other animals. In other words, it is held, though not in the same sense with Burns, that

A man's a man for a' that—

notwithstanding, that is, all the efforts which science has made, or may make, to show that he is virtually but an animal, and frequently in every sense a brute. Equally truthfully, however, may it be asserted that the potentiality of man must have frequently very narrow limits, while of that of other animals we have as yet but glimmerings. We know what is the *actuality* of mental and moral acquirement or progress in the savage; but it is as difficult to admit—it would be as inconsistent with fact to believe—that his moral or mental potentiality is that, or equal to that, of the civilised European, as it is to admit or believe that the moral or mental potentiality of the lower animals is on a par with that of civilised man. Intelligence is limited alike in the child, the civilised adult, the savage, the human idiot, and the animal, though the limit is not the same in all these cases. The possible *range* of mental or intellectual power has yet to be determined even in man, and man has also to confess his ignorance of either the latent psychical possibilities or potentialities of other animals, or of their mental acquisitions in relation to these potentialities. This subject of potentiality, of possible latent powers capable of development under favourable conditions, is nearly synonymous with—

7. The capacity for *progress* or improvement. As regards man, we know that in whole races of savages progress is either non-apparent or to a most limited extent; while many nations have remained stationary for ages, and others have not only retrograded, but perished. The Australian aborigines, according to Madame Bingham, are incapable of civilisation. 'The missionaries have long given up any attempt to civilise them.' The East African negro 'for thousands of years has made no progress, although he has had sufficient contact with cultivated peoples,' according to

Captain Burton. Here, again, is what Baker thinks of the Baris of Tropical Africa:—'How is it possible to improve such abject animals? They are not worth the trouble, and they are only fit for slaves, to which position their race appears to have been condemned.' A correspondent of 'Nature,' writing quite recently from Samoa regarding the present Polynesians, points out that, as a rule, savage races, unaided, do not better their condition—make no progress. 'From personal observation of savage and semi-savage life, I feel almost certain that a real savage is utterly incapable of in any way raising himself. He lacks the sensibility which must serve as a fulcrum for the lever which is to lift him.' China, Egypt, Assyria, Greece, Rome, Palestine, Mexico, Peru, afford illustrations of the fact that, even in the most highly favoured nations, steady, progressive improvement is not the rule. So far, indeed, from there having been progress in the human race as a whole, there are thousands of worthy people who believe that man has degenerated—in morals, if not also in mind—from the Paradisiacal type of perfection illustrated by Adam and Eve before the Fall.

On the other hand, the whole phenomena of *education* show the wonderful extent to which both the moral and mental powers of the lower animals may be cultivated or developed.

8. The *love of knowledge* for its own sake—the wish to know for the sake of knowing. This exists only in a limited number of men. There are whole races without any desire for knowledge even for selfish ends; and the little knowledge they possess—the fruit, mainly, of stern necessity—is of the most limited kind. The crass stupidity or non-intelligence of certain savage races has been dwelt upon by travellers. Thus the Brazilian Botokudo 'is not interested in anything uncommon. Nothing excites his *curiosity* or attention' (Büchner). Sir John Ross described the Eskimo as 'without any principle or rational emotion.' The ignorance of primitive peoples, even about themselves, is sometimes astounding. According to Houzeau, negroes cannot tell their own age, and the same has been said of the Apache

Indians (Büchner). 'In the Australian aborigines the capability of considering and *inferring* appears to be very imperfectly developed. The reasons which the colonists use in order to convince or persuade them are mostly such as are employed with children and half-imbeciles' (Büchner). Whether, or how far, a love of knowledge 'for its own sake' exists in the lower animals cannot be determined; but their thirst for knowledge, their possession of knowledge, and their intelligent application of acquired knowledge are all indubitable.

9. The faculty of *generalisation* or abstraction, the power of forming, or the possession of, general or abstract ideas. But there are many abstract ideas that do not exist in primitive man—for instance, those concerning good and evil, right and wrong, justice and injustice, or deity. Nor does he appear to possess the faculty of generalising at all, or he possesses it to a most limited extent. According to the high authority of Bishop Colenso, there is little or no idea of the abstract among the Kaffirs. 'The more common of our abstract ideas—such as spirit, soul, hope, and fear—appear to be absolutely wanting. But experience shows that, in this respect, other negro tongues are not more richly provided by nature.' The language of certain savage races is so rudimentary that it contains no words to 'express general ideas.' 'The lowest among the Oceanians and Africans . . . . are entirely destitute of general ideas or abstract notions.' The language of the Australian blacks contains no word to 'express a general idea' or abstraction; it has no word, for instance, for the notion tree. The language of many savage peoples is 'quite destitute of expressions for general notions or properties. . . . They have a special word for each kind of colour, for each kind of tree, but no general designation' (Büchner). The Veddas of Ceylon have no word to express colour (Hartshorne). According to Dr. Ireland, there are human idiots with no general or abstract ideas; and the same may be said of certain stages of infancy and childhood. It is indeed instructive to compare the faculty of generalisation in the human infant with the similar power, on the one

hand, in the civilised adult and the savage, and, on the other, in Mammals such as the horse or dog, or in birds (Houzeau). Miss Cobbe, the late Rev. Sydney Smith, and other authors who have closely studied the higher mental faculties of the lower animals, find themselves necessitated to concede to them the power of forming abstract ideas. The late Sir Benjamin Brodie thought it impossible to deny to the lower animals the power of abstraction. Leroy points out that the wolf has abstract, though frequently morbid, ideas of peril. As in so many other cases, much, or everything, depends, in determining whether this or that moral or mental attribute is peculiar to man or common to other animals, on the different possible *definitions* or nomenclature of such attribute—the terms by which it is popularly known.

10. The supposed absence in other animals of certain of the *higher moral or mental faculties*, including—

Reflection.	Wonder.	Hope.
Veneration.	Causality.	

But it is abundantly shown in other parts of this work that all of these faculties are possessed by certain of the lower animals. It has, in fact, to be proved, by those who carp and sneer at what they call the mere 'instinct' of animals, that any one of the higher, as well as of the lower, faculties—moral or mental—of man is altogether absent in them, or certain of them.

11. Actuation by *principle* or *motive*. The lower animals are, it is alleged, actuated only by physical desires or wants. But of how many men is this far more true? Many savage races are actuated only by present and personal interests, as exhibited, for instance, in food procuring (Houzeau). Their common motives to action are fear of punishment or the hope of the acquisition of advantage. In other words, their behaviour is determined, as is that of children, and in many cases, no doubt, the lower animals, by the principle or practice of *reward and punishment*. They are characterised by the simplicity and fewness of their wants, which relate mainly to the physical sustenance of the individual and the perpetuation of the species.

12. The discovery, establishment, and observance of *law*.

But a special chapter shows that, on the one hand, many races of mankind neither possess nor obey laws, while certain other animals do both.

13. Verbal language, or *speech*. But, as is fully shown in the chapters on 'Language,' it is not absolutely absent in other animals; nor is it always present in man, whether civilised or savage, healthy or diseased. Max Müller makes a very artificial and futile distinction of 'rational' language as limited to man; and his controversial opponent, Professor Whitney, is no more felicitous in his description of animal language as contrasted with man's 'instinctive' language. This is simply the old begging of the question as between instinct and reason—the prejudiced or ignorant ascription to instinct in other animals of what is unhesitatingly assigned to reason in man. It seems almost impossible for men, even of the highest culture, to regard man as what he really is, zoologically, morally, and intellectually—himself an animal.

14. The *understanding of language* is peculiar to man, says Mill, who has made so many other mistakes in his Mental Philosophy. His assertion is sadly contradicted by a whole special chapter of facts showing that certain animals not only understand each other's language but that of man.

15. *Printed* or *written* language. There are no such things as printed or written *records* among the lower animals, nor are there in numerous races of mankind; but a power of rudimentary writing or *drawing* is possessed by certain animals, which can draw lines or figures, or make other marks, on the ground with their feet—for instance, the elephant (Houzeau). Certain 'learned' elephants are trained to tell the age of visitors by making a certain number of simple footmarks—undoubtedly a rudimentary kind of *notation* (Houzeau). Certain other learned animals have been taught to construct *words* by the arrangement of letters. This points to a kind of—

16. Orthography or *spelling*. Various learned poodles, and other dogs, have been trained to place together, in various combinations, the printed or painted letters of man's

alphabet, so as to form *man's words*. We have here a knowledge and use of printed letters far beyond what is attained or attainable by whole races of man—with all his 'potentialities.'

17. *Tradition.* It has yet to be proved that all men possess tradition in some form—oral, written, or printed. Mere oral tradition occurs not only among certain savages, but frequently even among civilised or semi-civilised peoples. But there may be—nay, there is—a kind of tradition that exists without words, writing or printing, transmitted, as in man, from old to young, from one generation to another (Houzeau). We are too apt to forget the influence of *heredity*—the transmission of ancestral knowledge and experience. Many savage races have no oral traditions even—that is, no tradition of any sort, except that which may be involved in organic *heredity*. It does not follow therefore that, among the lower animals, in the absence of oral tradition, writing, and printing, each individual has to begin its education and experience *de novo*; that it receives no benefit from the wisdom of its ancestry; that there is nothing like an accumulation, a continuity, or a permanent record of the results of observation, reflection, and experience. *Heredity* furnishes such a record: the brain and nervous system—where they exist—are to be regarded as an *organised register of ancestral knowledge and experience* (Spalding). Traditionary information has been described in bees (Stickney) and in many other animals—that is, the hereditary transmission of information. It is more than possible, then, that certain animals may possess traditions of a kind equivalent to some of those which are oral in man.

18. Knowledge of the *past*. Various animals, however, profit by past experience, and they have very retentive *memories* for, or vivid recollections of, past events, as well as of persons, places, and things.

19. *Individuality*. But this is quite as striking, for instance, in the dog as in man, as is shown in a separate chapter.

20. The power of will applied to *self-control*. But it is impossible for man to exhibit self-restraint—the repression

of all his natural appetites, instincts, or passions—in a more marked form or degree than do many of the lower animals, especially the dog. Mere *will* in other animals is frequently as self-assertive and powerful as in man, as is evidenced by their resolution, determination, and perseverance.

21. *Taste for the beautiful*, the good, and the true. Æsthetic taste is superior in many birds to its standard—where any exists—in large numbers of men even among civilised races, and still more so in the majority of savage races. Among ourselves it has become a proverb, 'De gustibus nil disputandum;' and if we confine ourselves to woman's taste in dress alone, it must be confessed that she has much to learn from the lower animals, especially birds. While it can scarcely be asserted that other animals appreciate the good or the true—seeing that we have no means of ascertaining their capacities or ideas in this direction—it can with much certainty be affirmed that whole races of man, and whole classes of men in the midst of our highest civilisation, have no conception of either moral goodness or of truth—a subject which is treated of in one of the chapters on the 'Moral Sense.'

22. Sense of *ennui*. But it undoubtedly exists in other animals under the same circumstances as in man—for instance, among luxuriously kept house pets. In the dog it is one of the causes of *suicide*.

23. *Love of sport* for its own sake. Dr. Robert Brown, however, tells us that 'no savage has any idea of sport,' while dogs and other animals hunt for their own amusement, and share all man's pleasures in the race or chase or in games of various kinds.

24. *Laughter, tears*, and *sobbing*. But a special chapter is devoted to show that neither the one nor the other is peculiarly human.

25. Use of *tools and weapons*. To this subject also a separate chapter is devoted, showing how many instruments, natural or artificial, are used by the lower animals, and under what variety of circumstances.

26. Knowledge and practice of *agriculture*. Whole races of savage man, however, have no agriculture of any kind, no

cultivation of the soil. There is, for instance, no digging nor sowing among the Dokos (Büchner); no agriculture among the Andaman Islanders (Owen). The Nuehr and other savages 'depend for subsistence solely on what nature produces, therefore neither sow nor plant, and consequently are frequently on the verge of starvation' (Büchner). The Veddas of Ceylon live without 'any system of cultivation' (Hartshorne), and the Bushmen of Southern Africa have neither flocks nor cultivated ground (Richerer). On the other hand, according to the observations of Dr. Lincecum, who has carefully studied its habits since 1848, there is in Mexico, Texas, and other parts of the North American Union an ant which has been distinctively called the 'agricultural' or 'harvesting' ant. It 'not only stores up seed, but cultivates the plants which are to provide it, and carefully gathers in its crop at the right season. . . . In the wet season the seeds in the ant granaries are apt to get wetted and to sprout; and accordingly on the first fine day the ants bring out all the damaged grain and set it in the sun to dry, returning to the store only such as is uninjured.'[1] These ants may truly be said to cultivate their estates. They have grass paddocks round their nests, and they weed these paddocks. From their fields they clear off all herbage save *Aristida stricta*, a grain-bearing grass, called by Dr. Lincecum 'ant rice,' and they sow the seeds of the same grass. When ripe, the grain is harvested and the chaff removed. Several other grains or seeds of grasses and other plants are gathered and garnered in a similar way. These ants, therefore, sow, reap, and store grain for winter use. If the grain is set a-sprouting by damp from inundations it is dried in the sun on fine days—it is exposed, that is, only during the day and during sunshine, being taken indoors at night. According to Belt, certain leaf-cutting ants of Nicaragua cultivate fungi on decomposing leaves in their subterranean nests, 'the ants cutting and storing the leaves for the sake of the fungi which are subsequently developed in the débris,'[2] and which fungi he sup-

[1] 'Athenæum,' January 16, 1875, p. 87.

[2] 'Nature,' April 8, 1875, p. 458.

poses are used as food. The growth of a fungus in the interior of ant-hills has also been observed in India—an *Agaricus* of the section *Lepiota*—but in this case there is no apparent connection with the storage and decomposition of leaves or other vegetable substance. It has been alleged, though I have met with no evidence to substantiate the allegation, that other insects besides harvesting ants cultivate the soil and collect its fruits. Certain Termites are said to sow seeds (Houzeau). There is fuller evidence that some of the higher animals that do not sow them yet gather the ripe fruits of the earth and use them as food. A species of harvesting occurs, for instance, in apes, that gather all the fruits of a given spot. The Ladajac reaps, dries, and stacks—in short, gathers in its harvest.

27. Use of *fire*, including the art of kindling or producing it. Unquestionably the lower animals, unaided, cannot, or at least do not, produce fire by friction, or by chemical, mechanical, or other means, as man does; but they certainly use fire if they do not make it—e.g. in warming themselves; and certain anthropoid apes tend fires and furnaces, bakers' ovens and cooks' galleys, as assistants to or substitutes for man. Though I have no record of any instances, there is nothing to prevent such animals from using lucifer matches—the only means of fire-making known nowadays to perhaps the majority of civilised men. On the other hand, there is absence or ignorance of the use of fire either for cooking or for warmth among various savage human races, such as the Dokos of Abyssinia and the Mincopies (Büchner). It is, or was, unknown to the Marianne Islanders and the Gouanches of Teneriffe; so that its use is not universal in mankind; the art of making it is not instinctive; fire itself is not necessary to man's existence (Houzeau).

28. Use of the *metals*, including *metallurgy*. Certainly the lower animals do not mine metallic ores, extract metals from their ores, and fashion them into tools, ornaments, or weapons; but other chapters, such as that on the 'Use of Tools and Weapons,' show to what extent, and in what variety of ways, they make use of metallic substances—and metallic

instruments—fashioned by man. On the other hand, there is no use of the metals—probably no knowledge of them—in certain savage races of man (Büchner).

29. *Cookery*, or the preparation of food. A special chapter on this subject shows how many races of man are ignorant of all kinds of cookery—using their food, whether animal, vegetable, or even mineral, in its *raw*, crude state—and how many animals *prepare* their food in some way prior to using it, and make use of foods, animal and vegetable, *cooked* by man.

30. The use of *hands* by—their mechanism and structure in—man; the absence of true *fingers* and opposable *thumbs* in other animals. Man is approached, however, in this respect by the anthropoid apes, who use their fingers and hands for many of the same purposes to which man applies his—for instance, in their behaviour at table, including the use of table utensils. Many illustrations are to be found in the chapter on the 'Use of Tools and Weapons.' Moreover paws, beaks, claws, probosces, horns, and hoofs form efficient substitutes for hands—e.g. in the arts of animals. Wood has devoted a whole volume to the subject of 'Homes without Hands,' constructed by the lower animals.

31. The use of *clothing* as a protection against cold, or as a covering for nakedness, or both. But a separate chapter shows, on the one hand, how many races of man wear absolutely no clothing, and, on the other, how many other animals improvise a dress or adopt that of man.

32. The construction of *shelter* or *dwellings*—another of the many alleged differences of sufficient interest to require treatment in a special chapter. It is there pointed out how many races of primitive or savage man avail themselves of the natural shelter of rocks, caves, or woods, constructing no sort of habitations, and how many of the lower animals build themselves dwellings that excel in substantiality, comfort, and amenity the huts or hovels of men even in the vicinity of the highest civilisation.

33. *Blushing* is not peculiar to man, though it is much more readily seen in him by reason of the colour of his skin and the bareness of his face. *Colour-change* in the skin, or

various of its appendages, from the same cause as that which immediately produces a temporary hyperæmia of texture, must or may be regarded as an equivalent to blushing, while the feelings which give rise to the blush in man are expressed in other ways in other animals, though not less eloquently—e.g. shame and modesty.

34. The human *face*, it is alleged, is an organ of expression—an outward index of the mind—whereas the brute face is a weapon of offence and defence, an instrument to procure and prepare food (Lawrence). There are special facial muscles in man for the expression of emotion (Bell). All such statements are utterly fallacious, even absurd. It is shown in the chapters on 'Language' that the face of the horse and the dog, for instance, in spite of all their covering of hair—their eye and look are quite as eloquent as in man, while comparative anatomists have demonstrated their possession of the same great groups of facial muscles. No doubt the ram, goat, and other animals use their heads or horns to butt, bruise, or tear. So does man frequently use his head to butt his antagonist, and unquestionably man's mouth and teeth are not invariably used in the harmless process of food prehension or reception, but too frequently for the belligerent purposes of biting or tearing.

35. The *erect posture*. But it is erect or semi-erect in certain anthropoid apes, and it can be assumed temporarily where it is not natural in various apes or monkeys, or in the Quadrumana in general. The results are to be seen in their behaviour at table, their equitation, their usefulness to man as sailors, stokers, or domestic servants.

36. The *size*, strength, and general structure of body. But man cannot compare in strength or size with the elephant and many other animals, while the anthropoid apes resemble him closely in the general structure of his body—there being, no doubt, differences in the degree of complexity of certain organs, such as the brain. How little mere size, strength, or bodily structure has to do with the degree or kind of intelligence exhibited by an animal is shown by the ant, which in many respects is the intellectual superior of countless numbers both of men and elephants.

37. The greater length or *duration of human life*—man's superior longevity—in relation especially to time for the accumulation of knowledge—for exhibiting the fruits of education and experience. In man, however, maturity is a much slower process than in other animals; his progress, mental and moral, is confined in general to his earlier years. Man's advantage is therefore rather apparent than real. Moreover, the elephant and certain other animals are sometimes older than man, while many attain quite sufficient an age for the maturity of their mental and moral faculties. Thus at an exhibition held in London, in October 1874, in connection with a prize given by the Baroness Burdett-Coutts to costermongers, carters, waggoners, and drivers for humane treatment of donkeys, horses, and ponies, 'one pony was 38 years old, one donkey 34 and another 26 years old.' Orangs live for 40 or 50 years (Büchner). 'Dr. M'Bain, R.N., at Trinity, near Edinburgh, has an *Actinia*, called Grannie (*A. mesembryanthemum*), which has lived in a glass tumbler for 51 years, having been taken from the Frith of Forth at North Berwick, in August 1823, by the late Sir John G. Dalzell.'[1] I have myself been introduced to Grannie by her present proprietor. But even greater ages occasionally occur. Several instances are given of *animal centenarians*. Thus the common grey parrot of Africa 'has been known to attain the age of nearly 100 years' ('Chambers's Journal'). There is, or recently was, a cat at Gundagai, in New South Wales, supposed to be at least 100 years old. It was brought from England in 1788 ('Science Gossip'). A swan belonging to the Earl of Fife, that lately died at Macduff, and is now preserved (in the stuffed state) in the family museum at Macduff House, 'was supposed to be about 80 or 90 years of age.'[2]

38. *Preservation of the body* in health—the prolongation of life by artificial means—by knowledge of and attention to the laws of health. This applies only to the sensible minority of highly civilised races in man, while the chapter which describes self-submission of the lower animals to medical and

[1] 'Globe Encyclopædia,' Edin., 1875.

[2] 'Glasgow Weekly Herald,' January 20, 1877.

surgical treatment shows that they are not less solicitous sometimes about their bodily welfare than are mankind in general.

39. The gregarious or *social nature* of man. But in this, as in so many other respects, he has no advantage over other social animals.

Such are samples of the more intelligible objections raised by those who regard man as zoologically, morally, and intellectually different from all other animals. But numbers of less intelligible objections have been advanced by metaphysicians, theologians, moral philosophers, and others, who are determined, in one way or other, to make out that the animal mind differs from the human not only in degree but in kind—if indeed many of these objectors go so far as to admit the possession by other animals than man of anything approaching 'mind' at all.

For instance, to man is assigned the perception, and to other animals the non-perception, of 'speculative truth.' Animals 'apprehend the object, not the subject,' says Goodsir. They lack the 'faculty of apprehending universals,' according to Sir Alexander Grant, and so on. What such expressions mean I cannot profess to say, and I willingly leave it, therefore, to the coiners and users of such ambiguous expressions to prove that the faculties or attributes to which these expressions refer are present in all men—including savage or primitive man—and absent in all animals save man, or *vice versâ*. The probability is that, if this or that moral or mental quality can be shown to be absent in the lower animals, it will prove equally so in vast numbers of mankind.

On the other hand, there are a few writers who, feeling the unsatisfactoriness of the distinctions immediately before enumerated, have come to the conclusion—and the proper conclusion—that which alone is based on the evidence of fact—that the difference between the animal and human mind is one of—

1. *Degree of development* of what are virtually the same mental or moral powers; and of the—

2. *Mode* or manner *of manifestation* of what are essentially the same faculties.

That these differences exist is incontestable. It is a simple fact of natural history, and was to be looked for *à priori*. The mode of exhibition of the mental and moral faculties necessarily varies with the structure and habits of the individual, species, genus, and tribe, as does also their degree of development; but not always to the extent that might have been expected, sometimes rather to an extent that proves very unexpected. Thus, contrasting man as a whole with other animals as a whole, or the highest types of man with the highest types of animals, it may be said that the differences, both in the degree of development and in the mode of manifestation of their mental and moral powers, are very apparent and in favour of man. But if the contrast be made between the *lowest* races of man—whether civilised or savage—and the *highest* forms of animal intelligence—the best fruits of animal education—it certainly cannot be said that the comparison is in man's favour. This subject is, however, more fully and further discussed in the succeeding chapter.

CHAPTER X.

ALLEGED INTELLECTUAL AND MORAL SUPREMACY OF MAN.

THERE has always existed in man a tendency to *overrate* his own mental powers and moral qualities in relation to, or in contrast with, those of other animals. The preceding chapter has shown that the psychical distinction between man and other animals is so much less conspicuous than it is generally believed to be, that it is most difficult of determination, demonstration, definition, or proof. It is much more easy, indeed, to discover and demonstrate the points of *resemblance* than to define those of difference. The differences between the human and animal mind are sometimes scarcely or not at all perceptible, or they are in favour of the lower animals, not of man. Much, if not everything, depends on the character of the men and animals that are the subjects of comparison. If we compare the most intelligent, virtuous, good-tempered, best trained, or most thoroughly bred animals—such as the dog—with the highest types of man, it is impossible for man to excel the lower animal in the practice of many of the highest *virtues*, on whose possession man so prides himself. If we compare such dogs or other animals with countless thousands of degraded men, in civilised as well as in savage life, the former manifest indubitable superiority both in morals and intellect. But if, on the other hand, we contrast the highest type of man with the average, or with the lowest, type of other animals, there can be no question as to the inferiority of the latter in many points of morals and intellect, on which inferiority metaphysicians construct a defence of *man's supremacy*. We may sum up by saying that in certain respects, as to moral and mental endowments, certain animals

are the equals of certain men, while they are the superiors or inferiors of certain others. The human infant or child, at particular stages of its growth, is psychically on a par with some of the lower animals; whole races of savage man never attain the moral or mental development of certain dogs, while man of the highest culture is *facile princeps* of the moral and intellectual world here below.

Civilised man possesses the following elements of *superiority* over other animals:—

1. The power of speech.
2. The use of hands.
3. Knowledge of the arts of—
   - (*a*) Writing.
   - (*b*) Printing.
   - (*c*) Metallurgy.
   - (*d*) Glass-making.
   - (*e*) Cooking.
4. The production and applications of fire.

It is extremely difficult for man to realise the magnitude or importance of these advantages in the development of his moral and mental nature, and to make all due *allowance* for the disadvantage under which other animals labour in the non-possession of these accomplishments. The influence of dumbness, for instance, in man in the non-development of mental power has been pointed out by Huxley and other writers. But be it remembered always that some at least of these advantages are possessed by only a limited number of men—even of civilised men—as has been fully pointed out in other chapters.

On the other hand, dogs or other animals that may be considered in their way civilised or humanised—both as regards the individual and the race or breed—that have been subjected to persistent and judicious training by man—exhibit a manifest superiority to whole races or classes of man, both civilised and savage, in the following respects, which include the *noblest of the human virtues*:—

1. Heroism, patriotism, self-sacrifice.
2. Compassion or sympathy, charity, benevolence, forgiveness.
3. Love and adoration of a master.
4. Fidelity to trust, duty, or friendship.

5. Disinterestedness of affection.

6. Self-control, forbearance, magnanimity, repaying evil with good.

7. Industry, frugality, foresight or providence, diligence or perseverance.

8. Honesty or integrity, and honour.

9. Ingenuity or inventiveness, including fertility of resource.

10. Presence of mind in emergency.

11. Strength or force of will, persistency of purpose and effort.

12. Submission to authority or obedience to law.

13. Moral sense and religious feeling, including good feeling and right conduct.

14. The marriage, parental, maternal, and social relationships.

15. General intelligence or intellectual capacity.

16. Sexual chastity, and modesty or decency.

17. Sobriety.

18. Personal cleanliness.

19. Power of reflection and deliberation.

20. General amiability, from goodness of disposition or character.

21. Government by leaders.

22. Power of way-finding.

23. Acuteness of the senses.

24. Administration of public affairs.

25. The artistic or æsthetic sense.

26. The construction of dwellings.

27. Knowledge of their business or professional occupation, and its due performance as to regularity, and readiness or willingness.

Many authors have discoursed on the moral goodness and intellectual achievements of the lower animals on the one hand, and on the moral baseness or badness and the intellectual degradation of man on the other. Even clergymen are to be found who feel themselves bound in honesty to admit that 'some of the more intelligent of the brute creation show actually higher powers of mind than some of the

debased races of mankind.'[1] Scripture itself sends man to certain of the lower animals—the ant, locust, spider, and coney—for lessons in such essential virtues as industry, forethought, perseverance, and co-operation. Miss Cobbe describes the nobleness of the dog's general character, or of many of its higher impulses, as at least comparable with man's highest. Poets and novelists—writers of almost every class—have concurred in bearing testimony to the *moral worth*, as well as to the high intelligence, of the same animal—the dog. The horse, the mule, and even the despised ass are frequently man's superiors in sagacity as in amiability. The elephant gives to man important lessons in reflection, deliberation, ingenuity, perseverance, politeness, obedience, and affection. The beaver, the 'busy bee,' and many other animals practically teach him diligence, industry, and providence. Ants show him their model societies, and make him feel, if he is at all sensitive and sensible, his own real littleness, moral and mental, compared with their real greatness. And, in general terms, animal humanity and animal sagacity may well be studied and emulated by only too many men.

On the other hand, the evidence of facts has compelled many competent and frequently unwilling authorities to regard many men as not only *brutes*, but as morally and intellectually *inferior* to many brutes. Thus the Veddas of Ceylon are, according to Hartshorne, 'so little looked upon as human beings that, when a Vedda was tried and sentenced at Kandy for killing another Vedda . . . . the jury prayed for mercy for the criminal as being *only an animal*; and he was fastened up like a caged monkey.'[2] These Veddas, indeed, as they have been described by Sir Emerson Tennent and other residents or travellers in Ceylon prior to Mr. Hartshorne's fuller account in 1875, are scarcely to be distinguished, even zoologically, from the monkeys of the jungle in which and among whom they live. The South African Bushmen are by the Rev. Mr. Richerer (a missionary) and by other travellers said to be 'lower than the beasts around them in moral qualities, intelligence, and foresight.' The

[1] Rev. J. F. Moor, M.A., in 'Animal World,' February 1876, p. 20.
[2] 'Daily Telegraph,' August 30, 1875.

Bari of Tropical Africa, says Sir Samuel Baker, is 'below the brute. . . . The human beings of Central Africa live as animals, simply using the brain as a director of their chief wants.' Livingstone tells us that the soko kidnaps children, carrying them in its arms. But if tempted by a bunch of bananas it lets the child drop, 'while the young soko in such a case would cling closely to the armpit of the elder.' The Manyuema natives say that the 'soko is a man, and has nothing bad in him,' thus voluntarily and honestly confessing his moral and mental superiority to themselves. According to Sir John Ross, the Eskimo is 'a *beast of prey*, without any other pleasure than that of eating. . . . He devours as long as he can and as much as he can get, like the vulture or the tiger. . . . He eats only to sleep, and sleeps only as soon as possible to eat again.'

Man's inferiority to many of the lower animals is not only illustrated, however, by the moral and mental condition of savage, primitive, and prehistoric man, but also by certain degraded or degenerate, or uncultured classes or individuals in the midst of the highest civilisation—for instance, by the psychical condition of the human idiot, imbecile, lunatic, and criminal, as well as of hosts of persons who are simply illiterate, vicious, or of low intelligence and devoid of any refinement of feeling.

It is desirable here to give some attention to the remarkable differences in moral and intellectual quality that occur *in man*—in different races, classes, and individuals. It is most instructive to study, for instance, the nature and extent of the psychical differences between—

1. The infant or child and the adult, in the same individual, among the cultured classes.

2. The two sexes in the civilised adult.

3. The moral, religious, virtuous man and the criminal.

4. The individual who possesses the normally developed *mens sana in corpore sano*, and his idiot, imbecile, lunatic, and criminal brother.

5. The poet, mathematician, theologian, naturalist, natural and moral philosopher, collectively or individually, and the collier of Lancashire, the labourer of Dorsetshire,

the pottery worker of Staffordshire, the hind or yokel of Yorkshire.

6. The civilised or cultured adult and the existing savage or the prehistoric troglodyte.

These differences are very remarkable, whether considered as regards their nature or their extent—so much so that various authors regard them as pointing to kind as well as, or rather than mere, degree. The intellectual difference is not so great, perhaps, between an idiot and a person of average intelligence as between the latter and a Shakespeare or a Newton. The theological and the scientific mind, the poetic and the prosaic, the masculine and the feminine, the logical or mathematical and their antitheses, are by many regarded as essentially differing in *kind* or character. Those who support such a view argue that no cultivation of the one, as a rule, ever produces the other—that the agricultural peasant of the Cambridge fens cannot be metamorphosed into the wrangler of the Cambridge University. In other words, it is held by certain authors that there is a psychical *difference in kind* between higher and lower man even in the same race, inhabiting the same district or country. By other authorities, again, equally competent, it is contended that all these and other singular contrasts, however great, are mere *differences in degree*. In short, even as regards man himself there has been endless discussion as to whether the striking psychical differences that characterise certain individuals, classes, and races are distinctions of degree or of kind, or of both in various proportions. There have been many able advocates of all these views, and in a sense all have been right, though here, as in so many other questions affecting our views of mind and its constituents, all or much depends on our *definition* of the terms employed.

All that we have to do, however, with such unsatisfactory discussions here is to show that, whether such differences in man are to be regarded as of degree merely or of kind, of the same nature are the mental and moral differences that distinguish, or that are supposed to distinguish, man from other animals. In truth, the psychical difference between certain animals and certain men is much less obvious than

between different individuals, classes, and races of man himself. Thus the difference is not more striking between different ages, sexes, and other conditions of man than between the lowest savage races of man and the anthropoid apes, the dog, or even the ant. Pierquin held that the psychical difference is less between the human *infant* and a lower animal—such as the dog—than between persons of different *sexes* in a civilised state of society; and Houzeau considers the difference between *savage* and civilised man as great as that between man and the *ape*. But, whatever be their extent, that such differences are *simply of degree* is a doctrine held by the foremost naturalists of the day, and by an increasing number of those who allow themselves to study the subject of mind throughout the animal kingdom dispassionately and comprehensively. That the differences in question are of kind is the belief as yet, nevertheless, of the majority of men, including those more ingenious than ingenuous philosophers who, like Sir Alexander Grant, try to evade the obvious difficulty of determining whether given psychical differences are of degree or of kind by suggesting that they are of degree among the individuals, classes, and races of man, but of kind between man and all other animals. In other words, because the lower animals are not man, they possess a different kind of mind—that, namely, which consists wholly or mainly of instinct, as contradistinguished from man's true prerogative, reason. This, however, is but a remnant of the kind of vicious and futile arguments that are daily being made to give way before the rapidly accumulating mass of scientific evidence and inference.

The moral and intellectual differences, then, that separate cultured and savage man, or infantile and adult man, or the two sexes in man, are the *same in kind*, though not necessarily in degree, as those which separate man from lower animals. They are *quantitative*, not qualitative. Houzeau regards the real distinction as confined to the higher potentiality of man, his higher mental powers, as well as the actuality of their higher development; and this

conclusion commends itself as a judicially fair inference from the facts.

Man's claim to pre-eminence on the ground of the uniqueness of his mental constitution is as absurd and puerile, therefore, as it is fallacious. His overweening pride or vanity has led to his futile contention with the evidence of facts. He has trusted to a series of gratuitous *assumptions*. The supposed criteria of human supremacy, as the preceding chapter has shown, the alleged psychical distinctions between man and other animals, cannot stand examination. One after another they have proved to be fallacious, built upon unsatisfactory grounds. A careful consideration of the whole argument for and against man's psychical supremacy, a thoughtful analysis of the alleged or supposed mental differences between him and all other animals, must lead to the conclusion that these differences are superficial and apparent rather than radical and real. That man's specific designation, then —*Homo sapiens*—is far from being generally deserved or appropriate becomes obvious when we compare him in his lowest savage or primitive condition with such other animals as the dog or the ant.

CHAPTER XI.

INTER-RELATIONS OF INSTINCT AND REASON.

THE terms *instinct*, *instincts*, and *instinctive* are used in so many different senses, their definitions are so various, conflicting, confusing, ridiculous, or unsatisfactory, or it is so difficult to define them at all, that it would be a great advantage could they be dispensed with altogether, and other terms substituted possessing at least less ambiguity.

In the first place, the term *instinct* is too generally used as a synonym for animal intelligence in contrast with human reason, judgment, or intellect. Operations that in man are ascribed to *reason* are in other animals, on no proper grounds, assigned to instinct. The most diverse opinions exist, however, as to the possibility or propriety of separating animal intelligence from that of man, call the two by what names we may. Some authors, as will be seen in the sequel, hold that there is an absolute *identity* between instinct and reason as to kind, though not as to degree; others think that they are separated by a perhaps puzzling borderland: others believe that they overlap or pass into each other, or that they may co-exist or be associated in different degrees, or that the one may, and does, supersede the other; while others, lastly, consider that they are so strongly contrasted by their very different attributes or characteristics as to be diametrically opposed the one to the other. In the next place, many of what are called *instincts* in other animals are what in man are described as feelings, emotions, propensities, passions, appetites, desires, impulses, and habits; but some of these propensities in man belong to the lowest class of animal instincts—for instance, his whining or barking

like a dog in hydrophobia, his eating or chewing grass like a ruminant in various forms of insanity.

It is both instructive and suggestive to compare current popular with modern scientific *definitions* of instinct. Popular, and especially theological, opinion has for ages delighted in representing instinct as—

1. *Perfect at birth.* Whereas education is required, even in such so-called 'natural' acts as sucking the teat or otherwise seeking proper food. Spalding has shown that instinct is never perfect at birth, that its development is gradual, and that there is, therefore, progressive improvement in or of it.

2. *Unerring* or infallible. But our chapters on the '*Errors* of Animals' show how frequent and glaring are the failures or mistakes of so-called instinct, how identical these errors are in kind with those of human reason, and how absurd it is to set up any such plea as infallibility on behalf of animal instinct.

3. *Invariable* or undeviating. Our chapters on 'Education' and 'Adaptiveness,' as well as other chapters, contain abundant evidence of the incessant and almost infinite *variability* or plasticity of instinct; and even in the present chapter it is desirable to make a few special remarks on the variations of instinct. The whole phenomena of *improvability*—as developed, for instance, by education—show how unfounded is man's belief in the invariableness of instinct.

4. *Blind* and independent of *observation.* But our chapter on 'Investigation'—including observation and experiment in and by the lower animals—shows that these animals are guided by impressions on vision and other senses just as much as man is, probably more so.

5. Independent of *volition*—involuntary or non-voluntary. But will is manifested among the very lowest animals, as is pointed out in the chapter on the 'Evolution of Mind in the Ascending Zoological Scale,' while every degree of strength of will is to be met with in such animals as the dog.

6. Independent of *experience* and *instruction.* But the chapters on 'Education' and its results prove that this supposed attribute of instinct is as fallacious as any of the others.

7. Without *consciousness.* But, on the one hand, consciousness occurs not only among the lowest animals, and even among plants, while, on the other, there are many so-called mental operations in man that take place in the absence of consciousness—such, for instance, as the phenomena of what is now called unconscious cerebration, and of cerebral, spinal, or nervous reflex or automatic action.

8. Without knowledge of the *end* in view. But it is shown in many parts of the present work that animals are actuated by very definite motives, and have very distinct purposes, objects, or aims in view.

9. Its object is simply the physical well-being of the *individual*—the preservation of the *species.* But the countless instances of sympathy and self-sacrifice—of life-saving of other animals, including man himself—emphatically contradict such an ungenerous and unjust assertion—one that, like so many others relating to animal instinct, we can scarcely believe to have been seriously propounded by any person acquainted with the character and habits of such an animal as the dog.

10. Beyond *control.* We know, however, that many animals in many ways exercise an amount of self-control that would do credit to man even in his highest states of civilisation.

11. *Rapidity of action* is such that there is no time for *reflection.* And yet we know that many animals—in proportion to their maturity or age, their experience and the necessity for the employment of such mental faculties—exercise reflection in the same ways and under the same circumstances that self-sufficient man himself does. They take time to consider the probable results or consequences of different lines of conduct, and after most mature deliberation—including the balancing of chances or probabilities—they resolve on a given course and carry it into effect.

12. Arising without *effort*—as impulses. But so do ideas and feelings of all kinds in the most intellectual man.

13. Without *choice.* But we know that, in an infinitude of ways, animals show preferences and make the most deliberate selections.

So much, then, for the *current popular*—and especially theological—conceptions of the character or attributes of animal instinct—conceptions that have for ages barred the way to all progress in comparative psychology. *Modern scientific* ideas may possibly constitute or create too great a reaction in a very opposite direction. The favourite conceptions of instinct formed and expressed by our most eminent naturalists—especially of the evolution school of thought—are that—

1. All instinct is what is shortly defined as '*inherited experience.*' The idea implies that experience is acquired and transmitted, being accumulated, intensified, modified in the direction of improvement or otherwise, and organised in the transmission.

2. Instinct is only a *lower* or obscure kind or form of intelligence or reason.

3. Instinct is not a thing, power, faculty, *per se*, but only a *mode of action* common to all classes of mental aptitudes.

There is, no doubt, much that is true in all these modern views, but no one of them is unexceptionable. All are too sweeping in their generalisation. They aim at explaining and including all the phenomena of instinct; but they fail to do so, because the phenomena in question really belong to three different, though perhaps provisional, categories—to wit—

1. Phenomena *already explained*—or that are, or appear to be, capable of explanation—by the laws of heredity, habit, acquisition, knowledge, intelligence, or reason.

2. Phenomena that are *unexplained* at present, but which will probably, in the course of time, be as satisfactorily explained as those belonging to the preceding category; and—

3. Phenomena which, at present *inexplicable*, may long or always continue so.

That there are what may, with perfect propriety, be designated *acquired*—artificial, hereditary, inherited, or transmitted—instincts there can be no doubt. Such, for instance, are—

1. The fear of man.

2. The dread of other enemies—as of the hawk by the

sparrow or chicken, the lion by the horse, *Œstridæ* by horses, cattle, sheep, and reindeer.

3. Terror of fire, water, or other elements that are dangerous to life.

4. Barking—in the dog.

5. The finding of lost travellers by the St. Bernard breed of dogs.

6. The slave-keeping of Aphides by ants.

7. The sense of superiority, and its expression by obedience to leaders.

8. The moral sense—as is pointed out in a special chapter.

As regards any individual animal, however, such instincts may have been *either congenital or acquired.* They may have been originally acquired as knowledge, experience, or habit by some ancestor—intensified, modified, and transmitted through successive generations of offspring; in which case they become congenital in these offspring. Or they may have been acquired by the individual, as we constantly see taking place —for instance, as regards the dread of man and his instruments of destruction — in the birds of unvisited oceanic islands. But in this case we refer the acquired dread to *knowledge or experience,* because we see for ourselves its origin and growth; and it is only when a dread so acquired is transmitted to and through generations of offspring that are subject to a like experience, and when this natural fear appears at or immediately after birth in any such offspring, prior to the possible acquisition of experience by them, that we describe it as an instinct, as innate or intuitive, implanted by nature, not contributed or produced by experience.

It is frequently most difficult, if not impossible, in given cases to *distinguish congenital from acquired aptitudes.* One would suppose *à priori* that sucking the milk receptacle of a mother, or the selection of other suitable food, or the lapping of water or milk by the dog or cat, must be an 'innate' faculty; and yet we are assured by careful and conscientious experimentalists that these operations, with many others that appear to be congenitally instinctive or intuitive, are really *acquired arts,* the result of education and time.

It appears to me, in the present state of our knowledge of the inter-relations of, or confusion between, instinct and reason, convenient at least to *assume* that certain instincts are *congenital*, certain mental powers natural, innate, or instinctive. Such, for instance, are to be regarded the following instincts or groups thereof:—

1. The more purely *physical* ones of—

a. Hunger and thirst, including the so-called predatory or prey-catching instinct.

b. Self-preservation, or the love of life, including self-defence and self-protection.

c. Pleasure and pain.

d. Sense of existence.

e. Physical comfort, such as that arising from warmth.

f. Play or sport—playfulness, sportiveness, or friskiness in the young.

g. Migration.

h. Feeling of need of shelter or covering.

2. Those connected with *external sensorial impressions*, such as—

a. Weather-forecasting.

b. Sense of locality and direction, with perhaps the power of way-finding.

3. Those connected with the *sexual appetite*, including pairing, propagation, and incubation.

4. Those connected with the *social or family relationships*, including—

a. Adhesiveness, or the tendency to form attachments to person or place.

b. Love of society or companionship.

c. Longing for love and being loved, including maternal, parental, filial, and fraternal longings, yearnings, or affection.

d. Sympathy, compassion, or pity, charity or benevolence, with their opposites.

5. Destructiveness, including cruelty.

6. Acquisitiveness—the accumulation of property.

7. Combativeness.

8. Selfishness.

9. Love of power and glory, including pride and ambition.

10. Love of liberty.

11. Sense of dependence.

12. Love of the beautiful in sound, form, or colour.

13. Love of novelty and variety.

14. Imitation.

15. Constructiveness, including technical skill and art.

16. Feeling of modesty or decency.

17. Defiance, and its expression by menace.

18. Sense of benefit, with its expression by gratitude.

19. Fear, including, or leading to, suspiciousness.

20. Sense of supernatural agency—one of the bases or forms of the religious sentiment.

There are, however, endless difficulties in the application of the term *instinct* to many of the mental aptitudes just enumerated. One of the most obvious is the contradiction involved in two such conjoined terms as the 'instinct of imitation.' As Spalding points out, the two things—faculties or qualities—are antithetical or antagonistic, inasmuch as *imitation* leads to incessant modification of what is supposed to be unerring and unchangeable. Again, *fear* is probably invariably developed in connection with ideas of danger, real or supposed, and of the means of escaping or avoiding it.

Then metaphysicians, with a passion for elaborate mental analysis, tell us that many, or perhaps all, apparently *simple* instincts are really *compound*. What appears to be the very simple and intelligible desire for the conservation of life, for instance, is represented by authors of the phrenological school as being really a sense of danger, a fear that gives rise to caution or precautions.

It is obvious that such instincts as are mentioned in the foregoing enumeration vary much in their character. While we may easily conceive the possibility or probability of some of them having been *originally acquired*, we have a very different feeling in regard to others. No doubt all *may* have been originally acquired, and *may* have become congenital by hereditary transmission; and it is possible—nay, likely—that,

in the course of time, investigation may furnish evidence that not a few of them were, or must have been, at one time acquired; but I very much doubt whether *proof* will ever be furnished that *all* classes of instincts in man and other animals—for what are instincts in other animals must be equally so in man—were acquired.

Whether or not, however, we are to regard certain instincts as part and parcel of the original constitution of the genus, species, or individual, and certain others as acquired either by the individual or his ancestry, there are undoubted attributes of instinct that deserve or demand here a little special attention. These attributes include, for instance—

1. The variability of instinct.
2. The loss of old instincts, and the
3. Acquisition of new ones.
4. Their perversions or derangements.
5. Their latency.
6. Their vicariousness.
7. The dominance of certain of them, and
8. The antagonism of others.

The *variations* of instinct are illustrated in other chapters—for instance, those on 'Adaptiveness,' 'Education,' 'Errors'—but, even though there should be some unavoidable recapitulation, a few remarks on the subject are here desirable. Some of the best illustrations of the modification of instinct, with, by, or according to circumstances, are to be found in the phenomena of *nidification in birds*. Nest-building is popularly supposed to be conducted on the same uniform plan, under all circumstances, by the different individuals of the same species; but this is very far from being the case. The variation of instinct in the nidification of birds was long ago shown by Audubon; and recently the late Dr. Pouchet, of Rouen, pointed out the effect of change in the domestic architecture of man on the nest-building operations of the swallow. Adams refers to change of habits as to nidification in the cliff swallow of North America, which is now also taking advantage of man's dwellings. Town birds very commonly build differently from country birds of the same species, selecting a different site, shape, or materials, or all their methods

of construction, protection, repair, vary. The same occurs in birds or other animals — still of the same species — inhabiting different parts of the same country, or different and distant parts of the world. For instance, *artificial* are sometimes preferred to natural nests, materials, or sites; man's refuse — wool, hair, tow — man's dwelling, even his prepared artificial nests, are selected, rather than those materials and localities that were or are made use of by the species when at a distance from man and his works. Such variations in nidification are obviously determined, more or less, by various specific motives, purposes, or circumstances, such as necessity or desirability, or the saving of trouble, or the love of society, or the desire for protection, or by conditions of climate or temperature, or they are the results of experience and knowledge. The art of building fire-proof nests, moreover, is an acquisition on the part of the swallow.

Birds, however, are not the only animals that modify the character of their nests according to circumstances. A certain trap-door spider of New Zealand, as has been recently pointed out by Gillies, according to conditions of soil, locality, and surroundings, 'constructs an entirely different type of nest.' It shows, he says, an 'adaptation to special circumstances as they arise;' and he describes it as concealing its nest in an 'endless variety of ways,' the materials being 'as numerous and various as nature or accident has provided in the neighbourhood.' The commoner so-called 'geometric' spider also varies the construction of its nest (Blackwall). The nest of the same species of wasp is sometimes differently constructed, according to the locality, the cause, however, not always being apparent (Rouget).

Even less liable to modification than the operations of birds, constructive or other, are popularly supposed to be those of the *bee*. And yet Huber tells us that in some of his experiments humble-bees, in the absence of the usual material for roofing their nests, tore up linen clothes, or the cover of a book, and carded the disintegrated material into a felted mass, for use as an efficient substitute; while he gives many instances of their 'variety of resource .... in adapting

the form and size of their cells to the particular places or circumstances of their work' (Macaulay). In many other ways bees abandon routine, make deviations from custom, vary their operations with emergency.

Again, the manners and customs of the same species of *ant* differ according to its residence in England, the south of France, or India.

Instincts may be abrogated or *lost* in consequence of changed conditions of life. Thus domesticated and captive animals that are kindly dealt with by man, and that are sensible of the advantages involved in their changed mode of life, appear frequently to lose the instinct of liberty or freedom, in so far as no advantage is taken of the power or opportunities of flight or escape. In other circumstances instincts are commonly lost when they are not required: they lapse under *disuse*. But not always, for there is sometimes a useless and even a troublesome retention of the old instincts—for instance, in the captive beaver. There is frequently a *loss* of one or more, or all, the natural instincts in various kinds of *disease*, mental or bodily.

Just as *old* instincts lapse where they are not required, *new* ones are called into existence, or are developed, where they are needed; and these new or *acquired instincts*, it is important to bear in mind, are as *transmissible hereditarily* as the old ones. Nor is it less interesting to note that new instincts may be and are developed, if not created, *by man*. As an instance of the natural acquisition of a new instinct in the wild state may be cited the development, since man's settlement, of a flesh-eating propensity in the fruit-feeding 'kea' of New Zealand, a forest bird; whereas illustrations of the new instincts developed, directly or indirectly, *by man* are to be found in those which appear in domesticated animals.

It does not follow, however, that all instincts described as *new*—appearing for the first time in an individual or species—are so in reality, have been created where or when they did not previously exist. Many of them may have been merely *latent* or dormant, waiting to be developed—to be rendered conspicuous or operative by necessity or by favour-

able circumstances. Thus the new mental qualities developed by such physiological changes as maternity—the courage, affection, daring, self-sacrifice, which distinguish maternal love in birds and so many other animals, may be regarded as belonging to the category of latent instincts ready to show themselves whenever the need for their display arises. Other illustrations of *dormant* instincts, requiring only to be roused into activity by some such slight impression on the senses as a casual sight or sound, are to be found in the desire for freedom being awakened in the domesticated goose by the distant cries of its migrating wild fellows, leading the former at once sometimes to join the latter, thereby sacrificing all the advantages of man's association (Houzeau); or in the Eskimo dogs in a team leaving their track and their duty to follow game if it happen to cross their path, no command of the driver having then any power over them (Parry).

There is frequently a *substitution* or transposition of the supposed distinctive instincts of one sex or species for those of another; and this may occur naturally, but it more generally happens under artificial and exceptional conditions, as the result of association, imitation, or education. Such instincts may variously be described as adopted, acquired, unnatural, vicarious, and transferable. The phenomena of *foster parentage* abound in illustrations of this class of transferred instincts, including, as they do, the assumption of feminine duties by the male and the upbringing, by disappointed barren females or by bereaved mothers, of the young of other genera, species, or individuals.

There is frequently also a signal *perversion*, vitiation, or derangement of the natural instincts—for instance, of those of—

1. Self-preservation or love of life, in *suicide*.
2. Love of young, in *cannibalism*.
3. Love of proper food, in *morbid appetite*.
4. Sexual desire, in *erotomania*.
5. Destructiveness, in *murder and self-mutilation*.
6. Acquisitiveness, in *kleptomania*, which includes useless hoarding.
7. Migration, in wholesale sacrifice of life.

8. Combativeness, in morbid pugnacity and irritability.

9. Adhesiveness, in morbid aversions and causeless antipathies.

10. Love of liberty, in indifference to captivity.

Ample illustrations of these *perversions* are given in the chapters on 'Mental Defect or Derangement,' 'Suicide,' and 'Murder.' In a minor degree, vitiation of instinct occurs as a necessary result of pampering in household pets. This category fitly includes the non-gratification or repression, as well as the excessive gratification, of the more imperious physical instincts—particularly the sexual one—the effects of which are specified in the chapters relating to the 'Physical Causes of Mental Disturbance.'

Certain instincts are either naturally *dominant* at all times in certain individuals, or they are so at particular times or under special circumstances. There would appear to be a constant or occasional antagonism, or conflict for the mastery, in the individual character between various powerful instincts, just as there is also between virtues and vices, good and bad impulses; and sometimes one, sometimes another, gains the ascendency for the time, or permanently. Thus love of her offspring—maternal affection—frequently overcomes the love of life in a mother, developing that recklessness of personal safety which is so characteristic a feature of maternity. In other ways parental solicitude is constantly dominating over, neutralising, natural fear or timidity—not always, however, in a way tending to the welfare of the young; for among the instincts set aside in such cases for the moment there may be some whose abrogation is fraught with direct or immediate danger. In the dog—not a water dog—that rescues a child from drowning compassion must overcome not only its natural love of life, but its equally natural fear of water. Timidity, and even suspiciousness, are frequently mastered by wonder or curiosity.

The physical instincts—such as hunger and thirst—are naturally imperious, overruling sometimes all others. Thus Gould tells us of parrots and honey-eaters in Australia rushing to the edges of pools for water, utterly regardless

of his presence, 'their thirst for water quite overcoming their sense of danger.' Hunger constantly conquers the fear of man in the robin, as does in other birds the sense of imminent danger. In both cases the bird confidingly seeks the shelter or food-supply of man's dwelling or person. The instinct of self-preservation is often overcome by voracity in animals, like certain vultures, given to gorging themselves to repletion with animal food. But those instincts also which are more purely moral or mental—such as sympathy, generosity, benevolence, or charity—frequently conquer the purely physical instincts of fear of danger or love of life. The migratory instinct is more powerful than the maternal, leading parent birds to desert their young broods (Darwin and Adams). This collision of the migratory and maternal instincts, and dominance of the former, frequently occurs, for instance, in the swallow (Nichols).

While many instincts are intelligible probably from their *simplicity* and natural relationships—such as motherly love, self-preservation, or imitation—others do not at present admit of satisfactory explanation; for instance, certain forms of way-finding over previously untraversed ground. This class of dubious instincts is fully illustrated in the chapter on 'Unsolved Problems.'

The *number* of instincts in a given individual, species, genus, or class depends, of course, on the view taken of what is or constitutes an instinct. Kirby and Spence regard the determination of the number of separate instincts among insects as an insoluble problem. Among nurses alone in bees these authors describe or refer to thirty distinct instincts, and they infer therefrom that the *flexibility*, plasticity, or variability of instinct is greater in insects than in higher animals. Different instincts occur in different *castes* of the same species or community—for instance, in *ants* (Houzeau)—and there are special instincts in different *breeds* of domestic animals, such as the dog, both breeds and instincts being gradually developed by man's selection and culture.

So long as it is impossible satisfactorily to define instinct and reason—so long at least as we possess no satisfactory

definition, so long as we cannot draw the boundary line between them—it is impossible to determine the *range of instinct and reason* respectively in man and other animals, or in any individual, species, or genus of the latter. Using the terms in their present vague and contrasted acceptations, we are quite justified in asserting that, even in man—the lower races and the least cultivated of the higher races—*instinct predominates* over reason, impulsive over deliberate action; while in many of the lower animals—such as well-bred, thoroughly trained dogs—*reason predominates* over instinct, reflection over impulse.

Just as there is a frequent marked dominance of one instinct over another, there is an equally common *dominance*, then, *of instinct over reason*, or of reason over instinct. The former is illustrated by the well-trained elephant that becomes bogged in a quicksand. The instinct of self-preservation causes it to forget all its obedience and discipline —the results of education, which could operate only on improvable reason—so that it seizes its well-known, and probably well-loved, mahout in order to give itself some solid purchase for its feet; and, knowing this, the mahout in such a case betakes himself at once beyond the animal's reach, for to be caught by it in such extremity would be equivalent to certain death to the man. On the other hand, the dominance of reason, or of the results of reason—obedience, discipline, self-denial—is illustrated by a team of Eskimo dogs watching by themselves over and beside a dead reindeer for hours, and at last delivering it up untouched to their human masters (Wood), the imperious sense of hunger being here successfully overcome, the extreme temptation successfully resisted. Education, training, discipline—involving, it may be, a wholesome dread of punishment—overcomes natural antipathies and appetites—for instance, in predatory animals, such as a wild cat that was trained to take care of a tame sparrow, or in dogs brought up to watch sparrows, blackbirds, partridges, and hares, their natural game (Wynter).

It is important, in all considerations as to their real nature, to bear in mind that, just as various instincts *co-*

exist in the same individual at the same time, and may modify, neutralise, or supplant each other, the same happens with instinct and reason. They co-exist in different degrees in different individuals of the same species, and the one variously modifies, neutralises, or supplants the other. Even in *civilised man* instinct and reason vary in their interrelations with the age of the individual. The child is moved more by instinct than reason, while the mature or adult man is actuated more by reason than by impulse. His judgment guides and controls his instincts, while in the infant free vent is given to the latter and their control is a matter of education. We must never forget, however, how little reason frequently guides, or how often rather it fails to guide, children and savages, the idiotic and insane, and even philosophers themselves in their acrimonious disputations.

It has already been mentioned that by many recent authors instinct is regarded but as a lower and peculiar, obscure and not as yet intelligible or understood, *form of intelligence*. Whether or not this view be generally adopted, there can be no doubt of the intimate relationship between the two—an intimacy of connection that is illustrated by the impossibility of properly differentially defining them; for it has been shown in the earlier part of this chapter that all the current *definitions* by so-called mental philosophers—including, for instance, those of Paley, Whately, Hamilton, Brougham, Reid—are more or less faulty and mischievous or absurd.

On the whole, it does not seem to be yet possible conveniently to discard the term *instinct*. No doubt it has long been a cloak for our ignorance and prejudice. The continued use of such an ambiguous, indefinable term must be held tantamount to a confession of ignorance. There is no reason, however, for a concealment of ignorance where ignorance really exists; so that, even from this point of view, the employment of such a provisional and objectionable term is defensible. At present we have no better term to substitute for it. We cannot yet refer all the mental or pseudo-mental phenomena exhibited either by man or other animals

to reason or intelligence; and until we can do so, or otherwise satisfactorily name and classify them, it is at least an advantage or convenience to retain the term 'instinct' as a provisional designation for all the phenomena in question that are not at present classifiable under or assignable to reason. But when the study of comparative psychology attracts the attention it so well deserves, and in proportion as it is properly studied, more and more of the mental operations of the lower animals will be relegated to intelligence, more and more will it come to be recognised that what is instinct or intelligence in man is equally so in other animals—in short, that their psychical organisation is alike.

Physiologists and mental philosophers tell us that reasoning in man consists of comparison, abstraction, generalisation, recollection, reflection, and imagination (Carpenter); that is reason when fully developed and in its higher forms. For it need not be affirmed by the enthusiastic philanthropist that all men, lower as well as higher, and in all their stages of growth—in infancy and old age as in maturity, and in disease as well as health—can abstract, generalise, reflect, compare, imagine, or even recollect. In so far, however, as it can truthfully be said that man, as a species, possesses such mental faculties, it must equally be admitted that all of them occur also in certain other animals—not necessarily in the same degree, or manifested in the same way, though the difference, as has been shown in other chapters, is not always or often in favour of man. The constant exercise of *reason*, indeed, is absolutely necessary to many of the commonest or most familiar actions of animals. In other words, they are necessarily, in varying degree, rational creatures—if man's actions under similar circumstances are to be considered rational. As contrasted with popular conceptions of instinct, reason in other animals, as in man, is fallible, progressive, slow in action; while, so far from being simple, it involves operations of considerable complexity. Obviously certain of the lower animals can and do engage in regular or irregular courses or trains of reasoning or thought, and the process of reasoning in them is essentially what it is in man.

CHAPTER XII.

UNSOLVED PROBLEMS IN THE PSYCHOLOGY OF THE LOWER ANIMALS.

We have seen, or have yet to see, how many of the doings of animals, formerly ascribed to *instinct*, are really attributable to *reason* or intelligence, to observation and reflection; but there are many other phenomena connected with their habits which at present we cannot explain satisfactorily. To ascribe such phenomena to *instinct* is merely to confess our ignorance by the use of a term that has in such a case no definite signification, that has for ages been applied to phenomena that belong to the province of reason. The use of such a term in such a context is mischievous, as constituting an obstacle to scientific investigation.

It is much better to relegate all such puzzling faculties or phenomena simply to the category of the *unexplained*, so that special attention may be drawn towards them and may lead to their *experimental investigation*. It is quite possible that it may be necessary further to relegate certain of these faculties or phenomena to the category of the *inexplicable*. We may never be able to explain them satisfactorily on the theory either of reason or instinct. But, on the other hand, the probability is that due investigation will enable us to remove the majority of such problems from the category of the unexplained or even the apparently inexplicable to that of those that admit of satisfactory explanation, as being determined by, or dependent upon, ordinary intelligence or instinct. It may be that we have to look for missing links in the chain of evidence, or that we have simply to exclude by experimental tests certain suggested explanations, and so gradually limit the issue.

Possible solutions of the problems in question have from time to time been offered by ingenious, imaginative men. Such suggestions are not to be despised or rejected until at least they have been rigorously applied by competent experimentalists to the facts. The suggestions alluded to, that are applicable, or that have been applied, to different cases, include the following: that—

1. The lower animals use their *senses* in ways unknown to man; their senses, moreover, though the same in kind with his, being much more acute or delicate. The special senses involved are smell, vision, and hearing.

2. Certain animals, and perhaps man himself, possess *additional* or supplementary *senses*, such as a sixth sense of direction, locality, way-finding or homing, or of polarity—an intuitive knowledge of the points of the compass.

3. The lower animals, or certain of them, are susceptible to various influences that *do not affect man.*

4. There may be much *unconscious observation* on the part of the animals, unnoticed observation on the part of man. This may include, for instance, attention to the position of the sun, the noticing of landmarks and their topographical relations.

5. *Unknown faculties*, instincts, or susceptibilities may exist.

6. Powers or capacities that are usually *latent* may be, as Bishop Butler suggests, called into action.

One of the commonest and best illustrations of phenomena at present or as yet unexplained is the *way-* or *home-finding* by the dog, horse, ass, cat, and other animals over ground previously unvisited by and therefore unknown to them. I am leaving out of view all cases in which, by any possibility, memory or observation could have been, or probably were, operative—for instance, in the flights of courier or carrier pigeons—and refer only to those numerous cases in which various pet animals have been taken by masters or mistresses long distances from home by routes previously untraversed, in conveyances varying extremely in their character, and have found their own way home by a different route, usually the shortest and most direct, equally unknown to them, and

generally on foot where land alone had to be traversed. Authentic instances, incidents, or anecdotes of this kind are simply innumerable. Here it is desirable to refer only to a few, as illustrating their varying character in detail.

1. A collie (dog) found its way home by itself from Calcutta to Inverkeithing (Fifeshire, Scotland). It had come from Calcutta in a ship bound for Dundee, and from Dundee in a collier bound for Inverkeithing (Wood).

2. Certain French bees having been sent abroad in order to their acclimatisation in a French colony, found their way home in French vessels (Pierquin).

3. A dog was taken, by the most different modes of conveyance, including country roads and city streets (walking), market boat, railway, and steamer, from Holywell (Wales) to Manchester. It found its way back in a couple of days, performing part of its journey in the dark (Wood).

4. A fox twice found its way on foot from Westmoreland to Kent (Jesse).

5. A King Charles spaniel made its way from Lincolnshire to the Isle of Wight (Jesse).

In all such cases the presumable *motive* is attachment to and memory of locality or person, home love, perhaps home sickness. It has to be remarked that the animals usually credited with the possession of the homing or way-finding faculty are those that are *domesticated*, which show, on the one hand, the strongest attachment to home and master, and on the other the greatest general intelligence. But, whatever it be, the motive must be strong, for the peril and fatigue involved are usually great, and starvation, exposure, exhaustion, and death frequently result from the effort.

Accepting the facts as narrated, it would be easy to speculate to an unlimited and unprofitable extent as to how, for instance, the Scotch collie came to select the proper vessels to bear it to Scotland and to Inverkeithing. It is quite *credible* that the dog should have recognised the language of its master as spoken by Scotch sailors, for we know full well that shepherds' dogs and other dogs are acquainted with human words and phrases and their meanings; but it by no means follows that what is credible actually occurred,

nor would the supposition that this particular collie recognised Scotch as contrasted with Hindoo words help us far in the explanation of all the phenomena of its remarkable journey. We should still have to account for its discriminating between a Scotch- and English-bound vessel, and even were we to assume that it shipped itself accidentally in a vessel for Dundee, we must still explain how it came to select another vessel bound for Inverkeithing.

One of the most remarkable forms of *way-finding* by animals is their frequently taking a *direct* course homewards from any given point. From the bee's habit of doing so in returning to its hive after honey-collecting, such a straight homeward course is usually spoken of as a *bee line*. Frogs make bee lines for food or water; horses do the same for their favourite pasturages, and they take the straightest route back when they have been led or driven circuitously from home (Houzeau). There are certain other forms of *way-finding* that are as insusceptible of explanation as those already described—for instance—

1. In the dark, or in snow-storms.
2. In dangerous or trackless localities.
3. In the din and confusion of battle or of the battle-field.

Mules in dark mines know and find alone, unaided, their respective working places. Not only so, but, as in so many other cases, man's presence and attempted direction serves simply to mislead and annoy the more sagacious and trustworthy 'lower' animal. The leader of Eskimo dog-teams finds his way through blinding snow (Parry). The horse and mule show their superiority in some respects to their riders by way-finding in dangerous Alpine or other paths, where it is usually the best policy to leave them to their own guidance, their own observation, judgment, and discretion. (Farley). They may be trusted to find their way when their rider is ignorant of the road, has lost his way, deviated from some scarce perceptible track, or is incapable of directing the animal's movements—when, for instance, he is drunk and has fallen off, or has been shot off in battle. Another puzzling form of way-finding is connected with the discovery

by pet dogs of their masters' bodies among the slain after or during battle—as at Sedan or Waterloo ('Animal World').

It must be obvious that all the forms of *way-finding* above mentioned are not precisely of the same class or character. In certain cases the route may have been, or certainly had been, previously travelled, as in the case of the Eskimo dog leader, that finds its way in blinding snow *only when it has formerly traversed the same route*; or the animal may, and obviously does, make use of its senses, such as scent, as well as of its intelligence, observation, and memory; but in other cases of previously untraversed land and sea, and of great distances, the numerous discussions that have been recorded in 'Nature' and elsewhere as to the parts respectively played by a sixth sense, or by smell and vision, show that it cannot be said that any satisfactory solution of the problem has yet been offered and accepted.

In studying the interesting subject of *way-finding* in other animals it is important to enquire how far such a power occurs in *man*, and what is its nature if and when it is displayed by him. In the first place, then, many savage races are known to possess a power—not enjoyed by the civilised white man—of way-finding over trackless prairies and through pathless woods. The red men of North America are good instances of such prairie trackers, and the Australian blacks of bush way-finders. In both cases, just as it is also among the lower animals, the faculty in question has been popularly regarded as an *instinct* (Watson). As regards the North American Indians and their path-finding through the forests of Canada and New Brunswick, Dr. Adams points out that they are guided by *observation*—for instance, of—

1. The direction of the bent or fall of trees.
2. The position of their lichen-coating—both of which show the prevalent winds.
3. The course of streams.
4. A certain amount of star knowledge.

In other words, according to him, their faculty, knowledge, or skill is simply the result of *observation and experience*. Unfortunately, it is said that so useful a faculty is usually

obliterated by civilisation. Not always or necessarily, however; for it has been shown that white settlers in new countries, who are called upon by the necessities of life to develope and cultivate the same closeness of observation of natural objects or phenomena, to acquire the same kind and amount of experience, acquire also the same useful path-finding faculty through forest or over prairie.

Unerring accuracy in way-finding has been alleged on behalf of the Mongols, as on that of the lower animals, while the hunters of Kansas make use of a straight or *bee line* in certain cases; but there is no good ground for believing that this so-called 'instinct' is less fallible than other forms or faculties, whether of instinct or of reason. Equally in man and other animals, such way-finding as we have been considering is rare and *exceptional*, while *way-losing* is extremely *common* even in short distances and on ground previously traversed. It is only exceptionally intelligent animals and men, and under exceptional circumstances, that find their way over long stretches of previously untraversed land or sea. Nichols, who has had great experience in the Australian bush, and has studied way-finding there by the horse, referring to the remarkable rapidity with which it frequently makes its way home, explains that this faculty is exhibited only occasionally, by certain horses, under certain circumstances. Success in way-finding is, he thinks, in proportion to the animal's intelligence. He ascribes it to the use of no mysterious or occult power or knowledge. It is determined by attachment to home and by some knowledge of locality, both involving memory of places and persons and attention to landmarks. Homecoming depends on distance from home, the duration of absence, the discomforts of change of residence and of a new home, the sense of strangeness therein. But the home-longing may be overcome by kindness of treatment; attachment to a new home and master may gradually weaken and dissipate the first home sickness, until the animal loses both its desire for return to its old quarters and its memory of the way.

Nor must we leave out of view the singular and accurate

way-finding of *blind* men in the crowded, noisy streets of our large cities. The blind beggars of London, for instance, find their way safely through all its intricacies, apparently by sound and touch, while they recognise each other probably by voice-sounds (Greenwood). In these men certain senses, such as hearing and touch, apparently become preternaturally acute by high cultivation and constant use.

It may safely be affirmed that, equally in the lower animals and in man, whether civilised or savage, in the Mongol or Red Indian, white settler or blind man, the frequently remarkable power of way-finding depends in great measure, if not entirely, upon intelligence, observation, and experience. That in many cases of way-finding, observation of locality or landmarks is necessary is shown by such facts as that birds engaged in long flights make them by day, resting at night, and that rooks, losing their way in fog, wait as prudently as men would for a clear and light atmosphere to resume their journey (Nichols). Way-finding occurs in the most intelligent, observant, and experienced animals, and in men whose intelligence, observation, and experience have been exercised in special directions; and there are no instances of its occurring under opposite conditions in unintelligent or stupid, inexperienced, or young and unobservant animals or men. But it cannot yet be affirmed that in no case are *other* faculties or acquisitions involved than intelligence, observation, and experience, or that their operation is sufficient to explain satisfactorily *all* cases or kinds, or all the phenomena, of way-finding in the lower animals. For there are cases, immediately to be considered in connection with the wonderful phenomena of migration, that cannot be properly explained on the supposition that ordinary intelligence, observation, and experience are alone involved or applied.

Migration in various animals illustrates certain special kinds or forms of way-finding or way-making as well as of way-losing, and it also serves to illustrate a number of other phenomena of an even perhaps more puzzling kind.

The swallow and other *birds* make their way to the same nesting localities year after year over thousands of miles of

land and sea. Here we have, in the first place, instead of individual animals, large bodies or flocks traversing great distances. It may be that all members of the flock have previously traversed the same ground or distance, or at least that many of them have done so, and that there are leaders, specially intelligent, observant, and experienced, who are implicitly followed by the others; but it is difficult or impossible to understand what means the birds can have at sea of judging of *locality*, or how they can recognise *landmarks* across the whole continent of Europe and the whole length of the British Islands. No proper explanation is offered as to the sort of guidance the birds have in crossing long stretches of sea or land by *night*.

According to Rae, Mackay, and other travellers in Arctic America, such animals as the reindeer and buffalo, at certain seasons or under certain conditions, travel due *south or north*, as the case may be, the procedure being invariable in given circumstances in the same species. In such a case there is no evidence that any special locality is sought for, nor does it appear how far north or south the animal herds wander, for their travel is more like an indefinite wandering than a specific way-finding. But it is asserted that the animals at least maintain a course that is northerly or southerly, or due north or south, while it is suggested that they do so by reason of a *sense of polarity*.

Immense migrations of butterflies occur annually in Central and South America, always from and in the same direction, there being no return swarms (Belt). The same occurs in the Norwegian lemming, in which, however, the point ultimately reached by the mass of emigrants is usually, if not always, determinable. In their case it is the sea, into which they rush headlong and perish wholesale by drowning. Their migrations have, moreover, frequently been observed at various of their stages. They are characterised *inter alia* by the following singular phenomena:—The animals march in armies, in straight lines unswervingly, climbing laboriously up and over physical obstacles instead of simply avoiding them, exhibiting a morbid pertinacity or determination in adhering to their own mode of way-making, committing

the gravest errors in relation to their own lives and safety —biting reindeer, for instance, and getting trod to death by the pain- and panic-struck animals; entering rivers or lakes unnecessarily, and so being drowned in swarms; and finally losing their way apparently in the sea. As in the case of the butterflies, none ever return, and the exact locality whence they come is equally unknown. In the lemming migrations we have again the use of a bee line—a straight march apparently towards the sea, a march that allows no obstacles to stand in the way. But while in many cases of bee lines there is or may be some knowledge of the ground to be traversed, of the point of departure and of the goal or home, here there appears to be absolute topographical ignorance associated with other singular and no doubt morbid forms of stupidity.

Obviously the mode of way-finding is not the only puzzle among the phenomena of *migration*, nor is it perhaps the most interesting of several problems that suggest themselves for solution in connection with these phenomena. Thus of the *causes* of migration itself, on the one hand, and of certain of its results on the other, we have at present no satisfactory knowledge. As regards bird migrations, it has been suggested that their cause is or may be—

1. Search for food or water, or for—
2. Breeding ground, or for—
3. Light or warmth, or both conjoined.

No doubt some or all of these causes or motives may be operative in certain cases, as in autumnal southward migrations; but such suppositions do not account for *all* the phenomena—for instance, for the periodicity, apparent suddenness, and imperiousness of the impulse in the swallow, salmon, or lemming. There are migrations on the small scale the reason of which is obvious and intelligible—for instance, the daily or regular migration of a hen and her chickens in search of food, or the less regular but equally familiar migration of the reindeer to avoid insect pests, such as the gadfly. But it does not follow that migrations on a larger scale differ from these migrations of the hen, reindeer,

or other animals only in degree, the probability being that they are quite different in kind.

Among the most remarkable *results* of wholesale migrations is wholesale *destruction of life* in a great variety of ways. In the lemming alone loss of life occurs on the large scale by—

1. Hunger.
2. Cannibalism.
3. Falling a prey to feral animals.
4. Provoking fatal injury by the reindeer.
5. Drowning—

as well as in other ways; for it will face fire or other dangers as readily as it does water, and perish rather than avoid, or at least instead of avoiding, peril of whatever character. Here we have the element of *will*, deliberation; so that in one sense the self-immolation of the animals in the sea is to be considered an act of *suicide* proper. The whole phenomena have a morbid character from the irresistible impulse which urges the lemming armies to set forth—their utter improvidence as to maintenance *en route*, their incapacity to appreciate and avoid dangers, their suicidal immolation. Possibly these lemming migrations are simply singular illustrations of *epidemic morbid impulse*, leading to *epidemic suicide*.

Wholesale *destruction of life*, however, is not confined to the migrations of the lemming or other animals. Other illustrations are to be found in the annual or periodical massacre of the neuters by wasps (Westwood), or of the drones by bees (Kirby and Spence). In none of these cases can we explain the *object or cause* of such dire waste of life. It is easy to assume and to say that a *murderous instinct* or impulse is developed at certain times or under certain circumstances in the wasp or bee; but this is more a mode of describing the massacre itself, and the fury, unrelentingness, or mercilessness that characterise it, than an explanation why and how such an impulse should be periodically developed or such a waste of life become necessary or desirable.

Many animals show a singular *prescience* of certain classes

of coming events. Thus certain birds and other animals appear to know when a given district or country is becoming infected with *epidemic disease*, in which case they leave or avoid the infected district or country till the epidemic has disappeared. This has been specially noticed prior to outbreaks of such diseases as *cholera* in man. In the autumn of 1874 a paragraph taken from a foreign (German) journal called the 'Jardin Zoologique,' and relating to supposed or alleged *foresight* in birds, went the round of British medical journals and newspapers. It stated that 'a few days previous to the terrible ravages of cholera in Galicia in 1872 all the sparrows suddenly quitted the town of Przemysl, and not a single bird returned until the end of November, when the disease had entirely disappeared.'[1] 'The same circumstance was remarked in Munich and in Nüremberg. During the attacks of cholera at St. Petersburg and Riga in 1848, in Western Prussia in 1849, and in Hanover in 1850, every swallow and sparrow forsook the towns, and remained absent until the eradication of the scourge.'[2] In various contributions to the 'Natural History of Cholera,' published nearly a quarter of a century ago,[3] I gave other similar instances of the apparent influence of the epidemic cholera poison on a considerable variety of animals. In all such narratives it is obviously necessary, in the first place, to determine whether the coincidence is as stated—whether it be a fact that sparrows, swallows, jackdaws, or other birds or animals do desert cholera-stricken towns or districts prior to the outbreak of the epidemic in man—and in the next place we have to assure ourselves that the coincidence, if proved, is not merely accidental, but has occurred so frequently under the same or similar circumstances that some relationship of cause and effect must be admitted. Assuming that the coincidence has been indubitable and frequent, the only sort of foresight or prescience that at present we can safely ascribe to such cautious animals is of the same kind as that which enables them to *forecast weather change*.

[1] 'British Medical Journal,' vol. ii. for 1874, p. 312.
[2] 'Daily Review' (Edinburgh), August 31, 1874.
[3] *Vide* Bibliography.

The phenomena are capable of explanation on the supposition that certain other animals are more sensitive than man himself to the influence of, to him unknown, atmospheric conditions—a proposition that has been stated and discussed in the chapter on '*Sensitiveness*.'

Other illustrations, varying greatly in their character, of apparent *foresight or prescience* in the lower animals are to be found in—

1. The discovery of a master's thoughts or intentions by the dog or cat, including, for instance, the discovery of intended murders or robberies.

2. The discovery of water supply in the desert, steppe, or prairie by horses, cattle, camels, frogs, baboons, as well as by the blacks in the central deserts of Australia. Here again the so-called *instinct* of the lower animal or savage accomplishes that which too often baffles all the intelligence of the white man.

3. The discovery of coming ships long before they are sighted by man. Thus long before a ship is sighted off the coast of Tahiti she is signalled by the simultaneous crowing of all the cocks on the island. 'It is next to impossible to attribute the fact to a fortuitous coincidence, as it reproduces itself regularly without any exception'[1]—so regularly indeed that pilots, both French and native, act upon this species of signal by putting off to sea in their canoes in search of the coming vessels. So it is said, but in such a case it is undesirable to attempt explanation of the alleged fact until the fact itself is proved to be indubitable.

4. Premonitions or presentiments of death, danger, or misfortune, especially by the dog (Berkeley), cat, and horse. These premonitions include a forewarning of coming earthquakes on the part of the ox, sheep, and horse, which take alarm and betake themselves to flight and safety. They also include the fear of the shambles by oxen—a dread perhaps arising from the smells or sights to which they are there exposed. Here again we have to do probably—the facts being admitted—simply with a greater acuteness of certain of the *senses*, enabling other animals much earlier

[1] 'Constitutionnel,' November 1874.

than man, or perhaps even his instruments, to feel or hear the very slight shaking motion or rumbling noise that constitutes the first symptom of the earthquake.

There are doubtless many kinds of *coming events* that can be foreseen and prepared for by such animals as the dog—for instance, its master intending to take a walk or to go to church, market, fair, or chase. It may see its master's preparations, understand their significance, and make its own arrangements or hold itself ready for orders from its master. And in some of the more puzzling cases above given similar keenness of observation, similar shrewdness in drawing inferences, similar general intelligence, may be the *fons et origo* of the apparent power of prevision.

The mode or modes by which the individuals of a species *intercommunicate* for their common benefit have yet in many cases to be determined. We know a great deal concerning the *language* of animals, and we have indubitable evidence that they can, and do, constantly communicate to each other intelligence of all kinds—warnings of dangers, requests for aid, grievances that have been borne and that require redress, plans of foraging or warlike campaigns, and so forth. But in many cases we are yet ignorant what is the precise nature of the language used, by what means intercommunication is effected. Thus the 'American Whaleman' (Davis) states that 'sperm whales have a means of communicating with each other at long distances—how long has never been determined, but certainly at distances . . . . of six or seven miles. The means are a mystery, but every whaleman has observed the fact, and has based his operations in the chase upon it. It has been suggested that, as water is so good a conductor of sound, it may be sound; but the distances are too great for any sound which the whale is capable of making to penetrate, and it is observed that the *telegraph* is as perfect as ever in high winds, when a thousand waves are breaking.' We know just as little, however, of the language used by dogs to each other—for instance, when a small one tells a larger that it has been cruelly used by a bully, whom it cannot itself punish, requesting co-operation in revenge; or when the pariah dogs of Damascus, as de-

scribed by Mrs. Burton, pass on a stranger under their escort from one dog sentinel to another.

In many animals there are periodical assemblages of great numbers, sometimes from all points of the compass, of the object of which, and the nature of the singular proceedings that frequently characterise them, we must also be said to be ignorant. Some of these assemblages and proceedings in birds are believed to be *judicial*, and their observers have described judges, jury, culprit, advocates, officers of court, conviction, condemnation, and summary punishment. But in other cases such a supposition does not explain the phenomena. Thus a writer on the habits of the Indian crow says, 'In addition to their bathing assemblages, they have remarkable *parliaments* . . . . always held in quiet, out-of-the-way places, and always on the ground. . . . The proceedings are absolutely silent, and seem mainly to consist in small knots of individuals exhibiting their graces before one bird. They will hop round him in various attitudes, look at him first with one eye, then with the other, and all the while the central individual will be supremely indifferent to their attentions. Perhaps the proceedings will be varied by a disconcerted crow hopping to another group, there to exhibit his or her charms. This silent session will be maintained for an hour, and then suddenly break up with loud cawing, just as if the crows were being released from a disagreeable duty and were rejoicing in their escape. I never could make out what these assemblages are for. They are not amatory, for they occur as often after as before the breeding season, and they are not judicial, for they are absolutely silent and no results follow.'

There are many curious *companionships* or attachments between animals of different species and genera, including those between the lower animals and man, the cause, origin, or object of which does not appear, if indeed any intelligible motive can be said to exist. In some cases there has been an intelligible cause, such as gratitude for benefit, or desire for protection or for co-operation in defence; but in many others the only explanation that suggests itself—and it can

scarcely be said to be an explanation at all or always—is that certain singular attachments or companionships are determined by *caprice*. That such attachments, however, are of the most various kind, differing probably in their nature or causation, is shown by the following examples of them:—

1. The sudden attachments of dogs to human strangers, whom they had never before seen, and of whom they consequently knew nothing.

2. The association of the pilot fish and shark; or of the—

3. Sucking fish and the other larger fishes to which it fastens itself; or of the—

4. Zigzag (bird) and the crocodile.

5. Of certain fishes and hermit crabs with certain sea anemones.

6. Of certain ants and blind beetles.

7. Of certain pea crabs with mussels.

8. Of the fishing frog and a kind of eel.

Equally difficult of explanation are the remarkable *antipathies* or aversions so frequently shown by dogs to certain persons or things. There are many cases in which dislike, more or less decided and permanent, is accounted for on the ground of previous cruelty by a given person, and it is quite possible that certain other cases are to be explained by cruelty inflicted on some progenitor, in which case dislike to a particular class of men may become hereditarily transmitted. But, even accepting such an explanation, it remains to be determined how, by what means, dogs become aware of the presence of a man belonging to a hereditarily hated class. A few years ago much discussion took place in the columns of 'Nature' as to the hereditary hatred of butchers by dogs. It was shown *inter alia* by several well-known authors that young dogs, that had never had any cause to dislike fleshers or fleshers' shops, avoided, dreaded, or detested both as thoroughly as older dogs that might themselves have suffered from the cruelty of butchers when visiting butchers' shops or otherwise, and that certain dogs could detect a butcher even when well washed and dressed, far away from his shop, and under circumstances that might well have thrown the animals off their guard. In order to

judge of the force of this fact it must be borne in mind how readily dogs commit *errors of identity*, how easily they fail to recognise their own loved masters under unusual circumstances—for instance, as to mere dress. There are many instances of dogs not knowing their masters when the latter were simply nude—as when bathing—or had changed their ordinary dress for a hunting or fancy costume, or had appeared in the unexpected rôle of burglars or otherwise. The marked antipathy to butchers, and the discovery of butchers simply as such in any company and under any circumstances, by certain dogs, is usually attributed to the use of their keen powers of *smell* or scent; but that this is the proper explanation cannot be said yet to have been determined. Other singular *antipathies*, the nature or causation of which has also yet to be determined, include—

1. That of European dogs to negroes, according to Monteiro. His own dog never gôt over this aversion, one that is set down to the *odour* of the negro's skin, which is described as abominable. But it may be due partly also, or altogether, to mere *colour*.

2. That of nearly related birds which 'in their earlier years . . . . are close companions and friends,' such as the swift and chimney swallow.

It may be by smell or hearing, but it may also be by some means at present unknown, that the dog or cat, even when blind or when vision is otherwise impossible, discovers the approach or presence of friends or foes, masters or strangers. I have myself repeatedly seen an old blind cat at once detect the presence in a room of a domestic servant who was unkind to it, and seek safety—from the dreaded kick apparently—by immediate flight or concealment. It was impossible for me to determine from what I saw whether smell or hearing was chiefly at work, whether the animal recognised the girl's footfall or smelt her person or dress, nor had I the desirable opportunity of putting the matter to the test by experimental enquiry. Somewhat similar in character are—

1. The vague uneasiness felt and shown by the dog in proximity to a master whose person is unseen, or whose presence is presumably otherwise unknown.

2. The recognition, by a still more marked degree of mental excitement, of the body of a master or mistress, though coffined and brought from a distance.

3. The recognition of a mistress's propinquity by Lady Davies's paroquet on the occasion of an experimental visit paid to it, when it could neither hear her voice nor see her face.

4. Dogs pursuing dog-skin sellers (Pierquin).

5. The recognition and avoidance of human dog-stealers and police stray-dog killers (Low).

6. The detection of frozen travellers buried in snow.

7. The finding, collecting, guarding, or home-bringing of sheep in the dark (Hogg).

8. The detection of murderers or thieves; or of—

9. Lost or stolen and buried property or treasure.

10. A dog, though blind, becoming aware of a master's death ('Percy Anecdotes').

11. The distinction of a dead master on the battle-field from heaps of other bodies, all mutilated and unrecognisable by their features to man.

We have no clue at present to the nature of the attraction that bright, glittering metallic objects have for many animals, to their reasons for hoarding them, to the possible use that could under any circumstances be made of them. We know that rats, starlings, and other animal thieves pilfer coin, spoons, and other similar but heterogeneous articles that are apparently utterly useless to them, and that they accumulate them in hoards without making any other or further use of them. In the Vischaca such hoards are comparable to the midden heaps of primitive man (Cassell), except in so far as concerns the uselessness and heterogeneity of the articles accumulated, and those of the rat are frequently also both large and varied as to their constituents. Were it not that the most miscellaneous articles are piled up in unutilised heaps, we might conceive their being rendered available either as playthings or ornaments. If in any of these cases there is a distinct object in committing such thefts, making such acquisitions of useless property, it has yet to be determined what that object is. My own belief is,

as expressed in other chapters, that we have here to do with a sort of morbid acquisitiveness of the character of that which in man is known as *kleptomania.*

And there are many other phenomena connected with the habits of animals which at present puzzle us, which we cannot satisfactorily explain, for which we cannot assign any intelligible or obvious motive, cause, or object, and which are really, or may be, *morbid* in their character, referable to the category of *disease,* mental or bodily, to morbid impulse, morbid feeling, morbid thought, morbid will, morbid fancy; while there are many other phenomena that may not be, or appear to be, morbid, or the result of morbid mental action, that are yet unexplained and that cannot be enumerated here. Sufficient illustrations as to number and variety have already been given to indicate the kind of mental phenomena, or phenomena connected with mental action, in the lower animals that constitute puzzles or *problems awaiting solution,* and which will probably repay careful *experimental enquiry.*

MIND IN THE LOWER ANIMALS:

ITS NORMAL MANIFESTATIONS.

MORALITY AND RELIGION.

CHAPTER I.

THE MORAL SENSE IN LOWER MAN.

PRIOR to any consideration of the nature or extent of the moral sense in other animals, it is necessary that we should study *in man*—

1. The *absence* of morals, morality, or conscience—apparent or real, comparative or absolute.

2. The *genesis* and slow evolution or gradual *development*, and the cultivation, of the moral sense.

3. Its manifold *perversions* in disease or otherwise.

4. Its *decay* or degeneration in age.

Hence it is incumbent on the student of comparative psychology, before he can be in a proper position to judge of the moral status of other animals, to acquaint himself fully with the moral history or status of the following races, groups, or conditions of *mankind*:—

1. Early states or stages of human society, as illustrated by primitive or *savage man*.

2. The infant or *child* of civilised parents.

3. *Idiots*, as illustrating mental defect.

4. The *insane*, as illustrating mental disorder.

5. The *criminal* classes, as embodying, to various extents or in various senses, both mental defect and disorder.

6. What may well be called the *vicious*—though popu-

larly regarded as non-criminal—classes, higher and lower, among civilised nations.

7. *Eunuchs*, as illustrating certain peculiarities of correlated physical malformation and mental degeneration.

8. The second childhood of *old age*, even in the midst of the highest civilisation.

We have first, then, to consider the moral condition of such savage or primitive races as the following :—

I. *African.*

1. *East*—tropical or subtropical—

a. Johanna men, Mpongwe (Burton), and other negroes.

b. Dokos of Abyssinia (Büchner).

2. *West*—tropical or subtropical.

c. Natives of Dahomey (Ellis).

d. Natives of Angola (Monteiro).

e. Suahali tribe of Sierra Leone (Krap, Vidal).

f. Negroes of the Soudan (Büchner).

3. *Central*—tropical or subtropical.

g. Bari, Nuehr, Latooka, and other tribes of the White Nile and Albert Nyanza districts (Baker).

4. *Southern.*

h. Bosjesmans and Kafirs (Wood, Andersson).

II. *Asiatic.*

a. The 'wild men of the woods,' the jungle Veddas (or Weddahs) of Ceylon (Hartshorne).

b. The 'wild men of the woods,' the apelike tribes, the Samangs or Jacoons of the Malay Peninsula (Bradley).

c. The Andaman Islanders or Mincopies (Büchner, Owen).

III. *American.*

1. *North.*

a. Mexican, Apache, and other Indians (Büchner).

2. *South.*

b. The 'men of the woods,' or Botokudos, of Brazil (Büchner).

IV. *Australasian.*

a. The aborigines or 'blacks' of Australia (Büchner).

b. The Maoris of New Zealand (Colenso).

c. The Fijians (Wood).

Among these and in many other savage races we find—according to the concurrent testimony of travellers and residents, including missionaries on the one hand and naturalists on the other—the following negative or positive moral qualities or conditions:—

I. *Negative.*

1. No sense of *sexual decency*, modesty, chastity, virtue, purity, propriety, or shame.

2. No *marriage* tie or rite.

3. No *family* arrangements.

4. No *love*—maternal, paternal, conjugal, parental, filial, or fraternal.

5. No idea of *paternity* or of other relationships.

6. No *kindness* to or consideration for each other, whatever the natural or other relationship.

7. No *respect for woman* or sex.

8. No *compassion*, pity, sympathy for suffering.

9. No *mercy*.

10. No *regret*, remorse, self-reproach, or repentance.

11. No *gratitude* or other form of response to kindness received.

12. No *sense of guilt* or criminality.

13. No idea of *duty* or responsibility.

14. No conception of *right and wrong*, of moral good or evil.

15. No sense of *justice* or equity.

16. No respect for the rights of *property* or possession.

17. No *self-denial* or self-control.

18. No knowledge of *truth*.

19. No *honesty*.

20. No ideas of *honour*.

21. No *generosity*, magnanimity, or charity.

22. No respect for or obedience to *authority* of any kind, unless embodied in the form of *superior power*.

II. *Positive.*

1. Indiscriminate or *promiscuous* association, mingling or *intercourse* of the sexes, and of all ages.

2. *Lust*, lewdness, and debauchery.

3. *Desertion*, including exposure and mutilation of or insults to the young and aged, sick, weak or disabled, and dead.

4. *Cruelty* to, including the torture of, captives or enemies, and pleasure in witnessing the sufferings of their victims.

5. Bloodthirstiness, propensity to *murder*, including cannibalism.

6. Dishonesty, envy, covetousness, greed, proneness to *theft*, robbery, plunder of all kinds or degrees.

7. Prevalence of *perjury*, mendacity, lying.

8. *Selfishness.*

9. *Ingratitude*, including the repayment of good with evil.

10. *Treachery*, deceit, cunning.

11. Dominance of the instincts, appetites, and passions.

In describing the moral condition of *savage races* of man, some authors content themselves by speaking generally of an utter or comparative *want of the moral sense* or of conscience, while others specify and dwell upon the individual *moral defects* that have arrested their attention.

Of the first class of descriptions or opinions the following are illustrations: — Among the apelike tree-men of the Malay Peninsula 'not even the rudiments of morality seemed to exist' (Bradley). The negro of Eastern Tropical Africa 'has, or knows, no conscience' (Burton). The natives of the White Nile districts are 'inaccessible to all moral feeling,' while the Bari 'has not a moral human instinct' (Baker). The Brazilian Botokudo is 'quite destitute of moral notions . . . . entirely destitute of moral ideas. . . . Immorality is normal' (Büchner).

Of *individual moral defects* not a few traveller-authors have been struck by the *absence of gratitude*, or any feeling or expression thereto akin, in savages. 'No benefit or good, however great . . . . is appreciated or recognised by him. Such a thing as gratitude is quite unknown' in the West African negro (Monteiro). 'The results of emancipation have proved that the negro does not appreciate the blessings of freedom. Nor does he show the slightest gratitude to

the hand that broke the rivets of his fetters. . . . He is utterly obtuse to all feelings of gratitude' (Baker). 'Dr. Krap was unable to find any word expressing the idea of gratitude in the language of all the Suahali (Wásawahíli) tribes—a fact significant enough as to the total absence of the moral feeling denoted by that name' (Vidal). 'To a New Zealander gratitude was wholly unknown. They have no word for it in their language—no way of expressing a feeling that never existed in their breast. To a deeply reflecting mind this sad fact may appear to be a far worse one than their cannibalism' (Colenso).

The *want of filial love* is even more striking as illustrated in the treatment of parents, of the aged, weak, sick, feeble or disabled, and of the dead. The Fijians 'have not the least scruple in burying a father alive when he begins to be infirm, and assist in strangling a mother, so that she may keep him company.' As to the Bosjesmans of South Africa and the aborigines of Australia, 'I very much doubt whether they ever have possessed the least idea that any *duty* was owing to a parent from a child.' Among the North American Indians, as among the Fijians, 'the idea of being *subject to* their parents never enters their heads, still less does the idea of *loving* them. It is the glory of a North American Indian boy, at as early an age as possible, to *despise* his mother and *defy* his father,' while the young women 'utterly despise the elder and feeble women, even though they be their own mothers.' In short, filial love 'barely exists at all among them, and certainly does not survive into mature years' (Wood).

On the other hand, the '*parental love* of a savage does not last longer than that of a bird, a cat, or a dog, taking into consideration the relative duration of life;' nor, while it does last, is it of a very commendable kind. Among the Bosjesmans and the Australian blacks 'the father is just as likely as not to *murder* his child as soon as it is born —perhaps rather more likely than not. And if he be angry with anyone for any reason, he has a way of relieving his feelings by driving his spear through his wife or child, whichever happens to be nearest. Even the *mother* treats her child

rather worse than a cow treats her calf, and leaves it to shift for itself at an age when the children of civilised parents can scarcely be trusted to pass a quarter of an hour alone' (Wood).

All other kinds of *affection* are naturally at an equally low ebb—conjugal and fraternal, for instance. The Angola negro has no words or expressions 'indicative of affection or love;' nor does he show such emotions themselves (Monteiro). Among the African Latookas 'there is no such thing as love. . . . The feeling is not understood. . . . *Women* are so far appreciated as they are valuable animals. . . . A savage holds to his cows and his women, but especially to his cows. In a razzia fight he will seldom stand for the sake of his wives, but when he does fight it is to save his cattle' (Baker). Girls among the North American Indians 'will tear out of the hands' of elder women, including their own mothers, 'the food which they are about to eat, on the plea that old women are of no use, and that the food will be much better employed in nourishing the young and the strong. . . . If the tribe be on the move, and those who are old and infirm are felt to be hindrances, they settle the matter by leaving them behind' (Wood).

Anything like *sexual decency* or modesty is scarcely to be looked for. The sexual passion of the Angola negro is 'purely of an animal description' (Monteiro); and it cannot be said to be more than this in countless thousands of men and women even in civilised societies. The ape men of the province of Wellesley in the Malay Peninsula are 'even more degraded and lost to a sense of decency than the lowest orders of the animal creation' (Bradley). In certain savage races coition frequently takes place in public (Houzeau). The Australian black women are 'destitute of all sense of shame, and never think of covering their pudenda.' If not prevented by the police in Australian towns, these natives 'would daily violate public decency, after the manner of monkeys in a menagerie.' The Brazilian Botokudo, too, 'is without the slightest sentiment of modesty,' and in other savage tribes 'no idea of shame has ever caused them to think of veiling their sexual parts' (Büchner). *Defœcation* is another prac-

tice often of the most open or public kind, not only in savage peoples, but in the midst of our own boasted civilisation. There is probably not a town or village in—not a part of—our own country in which so revolting a practice does not constitute a prevalent public nuisance. Evidences of its existence as such obtrude themselves on my own notice literally daily.

Want of honesty—a propensity to steal, utter disregard for any rights of property—is a common feature in the character of savage man; and *disregard for truth*—untruthfulness—is almost an invariable accompaniment. The natives of Dahomey 'are not ashamed to be detected in lying and in the performance of base and dishonest actions' (Ellis). Of the negro of Angola Monteiro says, 'His constant want of truth and his invariable dishonesty are the result . . . . of the impossibility to understand that there is anything wrong in being either a liar or a thief.' Of certain African negro slaves in the North American States a German traveller writes, 'Almost all are thieves and liars. Hence the evidence of a black has no validity in a court of justice' (Büchner). The Sultan Abdallah, King of Johanna, in a letter to Dr. Kirk, H.B.M. Consul at Zanzibar, printed in one of our Government Blue Books, remarks, *à propos* of the want of veracity that characterises his subjects the Johanna men, of whom we have heard so much in connexion with the various Livingstone relief expeditions, 'A nigar . . . . was never born to tell the truth. . . . Our law never allows a nigar to swear as witness.' And there are hosts of travellers, and of residents, in countries in which the 'nigger' is a native, who constantly bear similarly strong testimony to his untruthfulness. Certain African tribes are 'lying and deceitful to a superlative degree' (Baker).

Indifference to human *suffering*, deliberate *cruelty* to the weak or helpless, enjoyment of the results of *torture* of victims, *mercilessness* or relentlessness, are also common attributes of the savage character. And in this respect, as in so many others, the human savage compares most unfavourably with the *Carnivora* or other animals. The Carnivora prey on living victims; but not only savage—frequently also semi-

civilised or semi-barbarous—man does the same. For instance, the Hamram hunters of Abyssinia cut steaks out of living cattle. The Angola negro 'has not the slightest idea of *mercy*, pity, or *compassion for suffering*. A fellow-creature or animal writhing in pain or torture is to him a sight highly provocative of merriment and enjoyment' (Monteiro).

The human *child*, even among the most highly civilised nations, has to be *taught* by rewards and punishments what is right and wrong, just as in the case of the lower animals. It has to *learn* to distinguish simply between what is *forbidden* and what is *permitted* long before it acquires any *abstract ideas* of moral right or wrong, if indeed in many cases it ever acquires such ideas. In other words, its moral sense or conscience has to be *developed*; it is not innate or congenital, and, as will afterwards appear, it is sometimes never duly developed. *Cruelty*, however, is natural or innate in the child. *It* appears to be an 'instinct.' Children have to be taught kindness to and consideration for each other and for other animals. Mercilessness or pitilessness is a frequent characteristic of childhood. The child often revels in its cruelty, takes the same evident pleasure in *torture* that the Red Indian does as regards his victim, the cat with the mouse, or the eagle with its captive (Houzeau). Infants and children, indeed, torment animals for 'sport' to themselves; and the same instincts of cruelty, love of sport, and destructiveness break out at a later stage amongst adults of the highest ranks, including royalty itself, when they revel in the butchery of battued pigeons or hares. Children, then, obviously require *education* or training in kindness, in justice, in a sense of right and wrong, in the doing of the right and avoidance of the wrong.

The human *idiot* shows the same conspicuous moral defects that characterise many savage races—man in a primitive state. He has no sense of decency or modesty. There is incapacity for moral as for mental development. Among the mental phenomena presented by wolf children in India are insensibility to kindness, the absence of shame, joy, gratitude.

In various forms of human *insanity* moral degradation

is also common. There is a whole group of phenomena denominated *moral* insanity, and moral perversion is perhaps the most frequent of the *precursors* of insanity—that which first attracts notice. Just as in idiots and imbeciles, and among many savages, human insanity in the midst of the highest civilisation is marked frequently by absence of all decency, modesty, chastity; by incapacity, in certain cases, of understanding or conceiving ideas of right and wrong; by propensities to theft, debauchery, and other vices. In short, there may be said to be, for the time, *no moral sense.*

A want or perversion of the moral sense characterises also the whole *criminal* class of the most highly civilised peoples. In French as in British criminals Dr. Despine and Dr. Bruce Thomson alike describe even entire absence of a moral sense, with a singular want also of *emotionalness.* There is no sense of duty to control the will, the criminal's acts being the 'result of the strongest instinct, appetite, or passion prevailing at the time. . . . Like brutes, savages, and idiots, they yield to natural appetites and passions, unrestrained and unreproached by any feeling of impropriety.'[1]

Of American criminals Dr. Macdonald, of the State Asylum for Insane Criminals, Auburn, New York, tells us, 'According to my observation, the chief characteristics of these cases are absence of moral sense, absence of delusions, while the intellectual faculties, such as they are, apparently remain intact. They seem to have the arts of *lying* and *theft* developed to the highest degree, the former of which they diligently make use of to create mischief and disturbance. They have bad *tempers*, which they not infrequently exhibit, their paroxysms of *passion* being followed by a sullen, moody state.'[2] These defects or perversions of the moral sense, then, are equally common in the insane and the criminal, and are equally familiar to the physicians of lunatic asylums and of prisons. Such phenomena are matters of daily observation to myself in my professional rounds as a hospital physician.

In classes that are not distinctively criminal, and some

[1] Reviewer in the 'London Medical Record' of May 1875.

[2] Seventeenth Annual Report of said Asylum (1877), p. 14.

of which are composed of members not necessarily illiterate or otherwise unrefined, there is a *low development* or a great *degradation* or perversion of the moral sentiment. The evidences of this vary both in their nature and number, according to the class whose habits are matters of enquiry. Of modern *white savages* those that approach most nearly to the primitive peoples of lands and islands beyond the pale of civilisation are, for instance, the *cave-dwellers* of Wick Bay (Caithness-shire, Scotland), as described by Dr. Mitchell, of Edinburgh—a group or tribe of wandering gipsies (or *Scoticè* tinkers). 'He found them to be of the lowest type; poor weak creatures—morally, intellectually, and even physically. They were the analogues of the inhabitants of our city closes, and were not a whit more degraded. . . . Among them virtue and *chastity* feebly existed; honour and *truth* even more feebly.'[1] Of a group of twenty-four persons some were wholly, others partially, nude, in both cases with 'no sense of shame.'

On the other hand, the recreations of the miners, colliers, or navvies of the central counties—including their wife-kicking—and of the aristocracy of the metropolis—including their treatment of the lower animals—illustrate eloquently and painfully the present state of moral feeling in Christian England among upper and lower classes alike. Even in the higher ranks, that boast of their culture or refinement, their advanced civilisation, their high mental endowments, their morality and religion, as distinguishing them from what are contemptuously spoken of as 'the brutes that perish,' intemperance, the social evil, debauchery, fast life, commercial immorality, battue-shooting and other forms of the pursuit of 'sport'—nay, the very wars that have devastated in our own day portions of the continent of Europe and of the United States of America—all point to bloodthirstiness, lust, selfishness, dishonesty, untruthfulness, and other *moral vices* as perpetually cropping up and contaminating society even in its highest forms of development.

[1] Report of a lecture on 'Cave Life in Scotland,' *Daily Review* (Edinburgh) of February 10, 1877.

Very appropriately does Goldsmith, in his 'Deserted Village,' speaking of tigers and their ferocity, refer to

Savage men, *more murderous* still than they.

In short, 'man's inhumanity to man' may well make 'countless thousands mourn' in senses and to an extent hitherto unthought of. It transcends in reality all the conceptions of the missionary, poet, or philanthropist. In order to estimate its enormity we must place it alongside the humanity of the lower animals to each other and to man himself, their tyrant. And, considering his opportunities and theirs, his moral and religious status and theirs, we cannot fail to be brought to regard these, in one sense, inferior creatures—such as the dog—as *morally the superiors* of hosts of human beings.

Darwin dwells on the differences of opinion that exist as to whether the moral sense is *instinctive or acquired.* Bain, Mill, Maudsley, and others have pointed out its *acquired* nature. It is, in truth, produced or *developed* in man by culture; it *decays* or disappears with age; it is *perverted* or destroyed by disease. It is certainly *not innate* in primitive man, in the civilised child, or in the idiot. In none of these cases does it at first or under natural and normal conditions exist, while in some it cannot be developed by any degree or kind of culture. Nor are individual moral feelings innate, any more than the aggregate of these feelings. *Sexual modesty* is not an original virtue, but is, like conscience, the *slow product of civilisation.* The *idea of marriage,* and all its relationships, is in the same position—not innate, but a gradual growth under favourable circumstances.

Captain Burton remarks, 'It is time to face the fact that *conscience* is a purely *geographical and chronological accident.* Where, may we ask, can be that innate and universal monitor in the case of a people—the Somali, for instance—who rob like Spartans, holding *theft* a virtue; who lie like Trojans, without a vestige of appreciation for *truth*; and who hold the treacherous and cowardly *murder* of a sleeping guest the height of human *honour*?' In short, there is 'no sin, however infamous, no *crime,* however abominable,

but at some time or in some part of the world has been, or is still, held in the highest esteem.'

As regards what are called 'abstract ideas'—of *duty*, for instance—Houzeau and other authors point out that they are not natural either to savage man or to the civilised child. The notion of duty, whatever be its nature, requires in both to be *developed by training*.

The moral sense, then, which has been so complacently regarded as an instinct peculiar to man, is *often absent* in him. There is a want of it, absolute or comparative, in—

1. Many savages.
2. Many children.
3. Many idiots.
4. Many lunatics.
5. Many criminals.

And this has constantly to be borne in mind in all expectations or enquiries concerning the presence or absence of the moral sense in other animals.

CHAPTER II.

THE MORAL SENSE IN OTHER ANIMALS.

ALL the ordinary definitions of what is variously called in man the *moral sense*, sentiment, feeling, faculty, or instinct, apply, though not necessarily equally, in the same degree, with quite the same sense or force, to an equivalent mental attribute or series of psychical qualities in other animals, and which attribute or qualities in other animals there is no good reason for distinguishing by any other name, simply because they are to be found in animals zoologically lower than man.

Thus the moral sense in man has been defined by different classes of authors to be, or to include—

1. A knowledge, appreciation, or sense of –
   a. *Right and wrong.*
   b. Good and evil.
   c. *Justice and injustice.*
2. *Conscience*, involving feelings of approbation or the reverse in relation to ideas of right and wrong.
3. The approval of what is conducive to well-being, and the disapproval of the reverse.
4. Sense of *duty* and of moral obligation.
5. Appreciation of the results of *honesty* and dishonesty.
6. Virtue or virtuousness, including especially such moral virtues as—

Conscientiousness.	Charity.
Scrupulousness.	Mercy.
Integrity.	Magnanimity.
Compassion.	Disinterestedness.
Benevolence.	Chastity.
Fidelity.	Modesty.

There is not one of these moral qualities that is not possessed, sometimes in a high degree, by certain of the lower animals, and more especially the dog; and there are many authors, who have been desirous of drawing marked psychical distinctions between man and other animals, who have nevertheless felt themselves compelled by the evidence of facts to concede to these other animals, or certain of them, the possession of morality akin to that of man. Agassiz, for instance, grants them morals; Froude speaks of their principles of morality; Brodie refers to the moral sentiments as occurring in gregarious animals; Shaftesbury allows to them a sense and practice of moral rectitude; Watson gives instances of their moral feeling, and Wood of their conscience. And certain animals have even been described as possessing a moral law and codes of morals.

The dog, at least, frequently exhibits a knowledge of *right and wrong*, making a deliberate *choice* of the one or the other, perfectly aware of and prepared for the *consequences* of such a selection. The animal has occasionally the *moral courage* to choose the right and to suffer for it, to bear wrong rather than do it (Elam). Not only does this frequently noble animal know the right, but it dares to do it, enduring the expected, the inevitable, consequent, suffering. One of the many evidences that the dog is sensible of right-doing is to be found in the familiar fact that when it performs an action which to it seems meritorious, or which it has reason to believe its master will deem so—when it saves a life, or successfully defends a trust, or resists some great temptation —it looks at once for some sign of the said master's *approbation*, perhaps for some reward. There is both the self-approbation or self-satisfaction of the *mens conscia recti* and an expectation of man's approval. The animal is gratified if such approval is in any form vouchsafed, disappointed if it be withheld.

It must also distinguish between the right and the *expedient*—what would be most for its own interest to do. In other words, it is just as apt as man is, and not more so, to take a *selfish* view of all affairs—to consider how they are likely to affect its own personal interests. The choice

that is finally made between the right, the expedient, and the wrong is determined by a variety of considerations—by conflicting emotions, by the balancing of probabilities and inclinations, by the degree or kind of temptation, by the presence or absence of witnesses, especially human, by other specialities of an animal's position, by the nature and extent of its moral training, by the character of the rewards and punishments offered on previous occasions. In the dog there is sometimes obviously the same kind of conflict and collision between virtue and selfishness, between a sense of what is *right*—which is too generally also what is painful, what calls for terrible self-denial and suffering, including the physical pangs of hunger and thirst, as well as the moral pangs, say, of unsatisfied revenge—and a sense of what is simply pleasant and profitable.

Temptation frequently begets in the dog, cat, and other animals the same kind of mental or moral agitation, and the same sort of result, as in man. Sometimes we can see—in the dog, for instance—the whole play of the animal's mind—the battle between its virtuous and vicious propensities, its promptings to the right and its endeavours to stick by the right, its longing for the wrong—for the titbit, which it knows it would be improper to steal—and the final triumph either of virtue or temptation. The poor animal, knowing or feeling the weakness of the flesh, sometimes has the moral strength, the force of character, the good sense, to *avoid temptation* altogether. But dogs, like men, are apt to have the most trying temptations thrust unexpectedly upon them, and then comes the tug of war of the appetites and passions—the moral turmoil that may make shipwreck of or that may strengthen virtue. Sometimes, then, by the dog, as by the man, temptation is successfully resisted after perhaps a series of protracted and painful moral struggles that have been very apparent to the onlooker. Unfortunately, however, equally in dog and man, the *resistance* of temptation is less common by far than non-resistance or non-success in resistance, the result of which is various forms or degrees of wrong-doing.

But in the dog, cat, and other animals this *wrong-doing*

is accompanied by a perfect consciousness or conception of the nature of their behaviour. They are quite aware of being engaged in actions that will bring inevitable punishment, which penalty, moreover, they are sensible they deserve. Miss Buist gives the history of a pet canary that was given to prancing about on her piano keys, and that knew it was wrong in so doing.

Abundant evidence of a consciousness of *wrong-doing* is to be found either generally in the—

1. Pricks, stings, or pangs of *conscience.*
2. The various expressions of a *sense of guilt*—for instance, the—
    - *a.* Sneaking gait.
    - *b.* Depressed head, ears, and tail.
    - *c.* Temporary disappearance.
    - *d.* Permanent absconding; desertion of home and master.
3. The multiform exhibitions of *contrition*, regret, repentance, self-reproach, remorse—

Or more specifically in the—

4. Efforts at *reconciliation* and pardon, including the giving of peace offerings.
5. Various forms of making *atonement.*
6. *Concealment of crime* or its proofs.
7. Artifices for *escaping detection* or conviction.
8. *Non-resentment of punishment.*
9. Sensitiveness to *reproof*, or even under mere reference to former delinquency.
10. *Punishment of offenders* by and among each other.

Conscience is frequently as severe a monitor in other animals as in man, its reproaches as stinging and hard to be borne, its torments sometimes intolerable. We may speak quite correctly, for instance, of the *conscience-stricken* animal thief, the cat or dog caught in the act of pilfering from the larder. The signs of detected and acknowledged guilt are the same in kind as would be exhibited under parallel circumstances by the human child. The animal, like the child, if rendered sensitive by previous moral training, shows unmistakably its consciousness of delinquency. Its look and

demeanour alike eloquently bespeak its sense of detection and disgrace. It understands its master's accusation as conveyed by eye, tone, word, gesture, and it either makes instant effort to escape the punishment which it knows it has incurred and deserved, or, if escape be hopeless, it, as calmly as may be, awaits the said punishment, and does not resent it, as it would did it feel it to be unmerited. A bitch having once eaten a quantity of shrimps intended for her master's dinner sauce, had only to be asked ever after, 'Who stole the shrimps?' to cause her to take to ignominious flight—ears and tail down—going to bed, 'refusing to be comforted . . . . the picture of shame and remorse,' while we are told 'she never stole again' ('Animal World').

A young dog having committed some offence against the established rules of his master's household, 'after we had shaken our heads at him and turned away . . . . although he must have been very hungry, would not touch his food, but sat close to the door, whining and crying, till we made it up with him by telling him he was *forgiven* and taking his offered paw, when he ate his supper and went quietly to bed.' Another dog, 'if he has done anything wrong, comes up looking very much ashamed of himself and voluntarily offers his paw' (Wood). Here we have decided efforts at *propitiation* of an offended master or mistress, and after the fashion of man's reconciliations by the shaking of hands, as nearly as the dog can imitate this arrangement. There are cases in which regret or remorse leads to the restoration of stolen goods. A dog that had murdered a duck was caught in the act of burying its dead body—that is, of concealing the evidences of his crime. 'So deeply was his conscience pricked that when he found himself arrested by a bush he ran the risk of dying of cold and hunger rather than allow himself to be discovered' (Wood). When a large, magnanimous, powerful dog—for instance, of the Newfoundland breed—has allowed impulse or passion to hurry it into some rash act, such as killing or too severely punishing some puny pug that has been merely forward, impudent, or annoying, it frequently and eloquently expresses its shame, regret, or remorse.

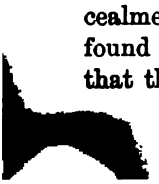
As in man, conscience or conscientiousness sometimes

has its strange or striking vagaries, eccentricities, or inconsistencies in other animals. Thus a retriever that would himself touch no food belonging to his master, yet offered no objection to theft of the same food by a cat, nor did he decline to accept a share of *her* plunder (Wood).

The sense of guilt and its expression is more fully discussed in the chapters on 'Crime' and on 'Language.'

Not only do animals feel their own wrong-doing, but they appreciate evil or evil deeds in their young and in their fellows, including other genera and species, and man himself. They show this, for instance (1), by the punishment of offenders, if not of offences, as well as (2) by the prevention of threatened wrong-doing or the defence of the wronged, or (3) by the resentment or revenge of injury or injustice of any kind. Thus various animals resent and revenge the wrongs committed by *man* not only on themselves or their fellows, but even on brother man; and this sense of wrong or injury inflicted upon others leads sometimes to their *defence of man* against his fellow-man. A case happened recently in Ireland of a pet cow that defended its mistress against the ill usage of its master, its mistress's husband; and many instances have been recorded of the dog, elephant, and horse doing similar kindnesses to their human favourites. It ought to be not a little humiliating to man's pride that the so-called 'lower' animals have so frequently to act as *mediators* in human quarrels—to defend lordly man against his own species.

In the same sense in which it can be said that the dog and other animals are endowed sometimes with a perception of wrong, it may also be said that they acquire a sense of the *illegality* of certain not only of their own actions, but also of man's. Human tribunals have apparently regarded sheep-stealing dogs as conscious of the illegality of their deeds, as sensible of the nature of their nefarious employment, as aware of the character of their offence or crime, as alive to the chances of detection and of the necessity for secrecy or concealment, for nocturnal operations, for the avoidance of being found associated with any of the evidences of guilt, as feeling that they deserve punishment and that they will receive it



on capture or conviction. These tribunals have, in other words, recognised the power the guilty animals have possessed of selecting between the right and the wrong, and of their having chosen the latter with full knowledge of consequences. And in all these respects human judges have so far formed correct conclusions or decisions, though, as is pointed out in the chapter on 'Moral Responsibility,' they have erred in forgetting that the criminality in such cases has been the evil fruit of man's education of his animal accomplices. The dogs of the brigand, smuggler, or poacher, like those of the sheep-stealer, display a knowledge of the illegality of the operations in which they are habitually engaged. They take all means of avoiding custom-house officers or gamekeepers, deliberately making use of all kinds of deception; but to all this they are trained by man.

No doubt what is popularly spoken of as a sense of right or wrong, of legality or illegality, in the lower animals may, or will if strictly analysed, be reduced to a distinction between what is *forbidden* and what is *permitted* by man, who is recognised as a sufficient lawgiver and administrator—what will bring *punishment* on the one hand and *reward* on the other. But this is just the kind of feeling as to right and wrong, legality and illegality, that exists in the savage adult, that is generated at first in the civilised child, that is exhibited (if at all) in the criminal, the lunatic, or the idiot. It cannot be truthfully affirmed that *abstract* or refined *ideas* of moral good and evil are common to all ranks of men, or are innate even in civilised man. In our brother man, and with all the help that spoken and written language can give us, there can be no doubt of the difficulty, frequently the utter impossibility, of knowing whether any and what conceptions exist as to right or wrong, good or evil, justice or injustice, honesty or dishonesty. It need, therefore, be no matter of surprise if we cannot ascertain or demonstrate the presence or absence of any sort of definite conceptions on such subjects in the dogs, fowls, or other domestic animals that are so constantly under man's observation. Practically, however, as has been, and will be further (in the sequel) seen, as practically as in whole races of man, the

dog and other animals give unquestionable evidence that they know what, according to man's law to them, is right and wrong, and they prefer to do the one or the other according to their individuality and the character of their previous moral training.

Monkeys and other animals sometimes show, as much as does the human child, a very decided enjoyment of *forbidden* pleasures, not only knowing that they are, but because of their being, interdicted.

The dog, horse, mule, elephant, and other animals have frequently a distinct sense, feeling, or knowledge of *duty*, trust, or task; and this not only as regards their own personal obligations, but in so far as duty of various kinds is attachable to other individuals of the same species, or to those of other genera and species, including man himself—when, for instance, such duty of man's has any immediate reference to, or connection with, themselves. In other words, they have clear conceptions of their own duties, and of the duties of others, including man, in relation to them.

The discharge of their own duties, which in many instances are *self-imposed*, involves, or is characterised by—

1. An *understanding of the nature of the work* to be executed—of the duty required, for instance, by man.

2. *Conscientiousness* in the discharge of duty, which again implies—

   a. Sterling *honesty* and fidelity.

   b. Willingness or *zeal.*

   c. Regularity, including perseverance, patience, and method.

   d. Accuracy, based on high intelligence.

The working elephant requires that the nature of its work should be explained to it, to as great an extent as possible demonstratively—by illustration. It very quickly and readily comprehends what it is that man wishes and expects it to do, and it very soon learns to execute its task without supervision, bringing to the discharge of its duty so much zeal or heartiness, so much conscientiousness, that it frequently displays an obvious *dread of failure* in, or of inability for, the due fulfilment of its trust, even when the causes of such failure or

incompetency, where they exist, scarcely come within, or are altogether beyond, the animal's control. There are such things in the dog, elephant, horse, and other animals as excess of zeal, wrong ideas of duty, mistakes in the mode of discharging it, and *morbid conscientiousness*, the discussion of which, however, belongs rather to such chapters as those on 'Error' and on 'Mental Derangement' or its causation. Man's cruel taunts not unfrequently lead the too willing horse or elephant to the attempting of tasks for which their strength, or lack thereof, does not qualify them, and death in or from such attempts is the occasional result; while the dog sometimes carries its honesty or fidelity in the defence of a trust to a ridiculous extent, or displays qualities, noble in themselves, under absurd circumstances. The dog's anxiety to learn his duty has been pointed out by the Ettrick Shepherd, who thus writes of his celebrated Sirrah:—'As soon as he discovered that it was his duty [to turn sheep], and that it obliged me, I can never forget with what anxiety and eagerness he learned his different evolutions.'

Duties that are *voluntarily assumed*, that are frequently of an irksome and even unnatural kind, are sometimes discharged in the most admirable way—for instance, by self-constituted *foster-parents* that have adopted orphaned or deserted young, often belonging to other genera and species, and even to natural enemies.

Quite as frequently, perhaps, parental or maternal duties, of a natural and important character, are *delegated or left* to any other animal possessed of a sufficiently powerful charity or compassion, a sufficiently strong maternal or parental 'instinct.' The duties of parentage or otherwise may be simply left undischarged, without the slightest regard to the results of such neglect; every opportunity may be taken of shirking work that is disagreeable, or a task, of whatever nature, is executed in a very perfunctory, perhaps merely nominal, way. There is, in other words, in some cases just as decided an insensibility to the claims of duty, just as marked a cold indifference to its discharge, as in other cases there is conscientiousness and kindliness. It is only fair, however, to bear in mind that such *apathy*, frequently of an obviously

unnatural character, is one of the common results of *mental defect or disorder*, just as it is too frequently in man himself.

The dog frequently makes duty and its discharge paramount to all other considerations. To it are sacrificed even revenge, on the one hand, or temptations to the pursuit of game, or to access to food, on the other. Death itself is sometimes preferred to the desertion of a trust or charge (Watson). Many a dog restrains all its natural propensities under a sense of duty and responsibility. When 'on duty,' entrusted with a message from a master, it very literally places 'business before pleasure;' its self-control may even prevent desirable or necessary self-defence.

Whether it be from a sense of justice, of duty, or of conscientiousness, it is a fact that certain working dogs and other animals not only attend faithfully to their own duties, but see that their companions give equal attention to theirs. They *exact duty* or work from, or enforce it in, their colleagues (Watson).

Certain of the lower animals have a very decided sense of *justice and injustice*, of equity or fairness and the reverse, as is more fully pointed out in the chapters on 'Law and Punishment' and 'Crime and Criminality.' Thus the dog, horse, mule, ass, camel, elephant, and other working animals have a feeling that 'the labourer is worthy of his hire;' that they deserve a certain meed of praise, credit, or reward—a certain return in food and drink, in domestic comfort or personal attention—for service rendered. There is a clear recognition of the value of service—a knowledge of personal deserts. Hence they so frequently exhibit a sore sense of ill-requital of hard labour or of self-sacrifice. Punishment which they know to be undeserved they resent—sometimes dangerously to man—and in doing so they discriminate and estimate man's injustice.

The bread-buying dog does very much the same thing—detects and protests against man's unfair dealing when, offering its penny for a roll, a baker tries, waggishly or otherwise, to cheat it by giving it something of inferior value or refusing it a *quid pro quo* at all.

There must further exist, in certain animals, some per-

ception of the distinction between spoken as well as acted *truth and falsehood*, fact and fiction; for we are told, for instance, that the parrot sometimes not only detects, but denounces with the utmost indignation, man's verbal falsehoods ('Animal World'). On the other hand, one of the occasionally base or bad purposes to which the same bird applies its wonderful gift of speech is *mendacity*: so that it is capable at once of 'telling lies' itself and of detecting and reprimanding falsehood in man.

A certain sentiment of *decency*, modesty, or propriety occurs in various social animals, illustrated as it is by—

1. Their sexual bashfulness and chastity.
2. Their care of the dead, including the—
3. Use of dying-places and cemeteries.
4. Their employment of latrines or their equivalents.

It has to be remarked that the moral virtues are illustrated mainly by or in those animals that have directly or indirectly received their *moral training* from man—such animals as the dog, elephant, and horse. As a general rule—to which there are exceptions both in man and other animals—the human child and the young animal can equally be educated both to *distinguish and do the right*. In the formation of their character *moral virtue* may be made to dominate over moral vice, though it is probably impossible in either case to extinguish the latter. Moral perfectibility may be aimed at, though it cannot be attained; but the degree of moral excellence attainable is such in other animals, as in the child, that it should stimulate man to put forth all efforts in the moral training of both. This, however, is a subject that pertains more properly to the chapters on 'Education.'

CHAPTER III.

MORAL MERIT AND DEMERIT.

THERE are many worthy people who, while they are compelled, by the evidence of facts, to admit that certain animals perform actions that from man's—that is, their own—point of view must be regarded as beneficent, deny that such actions in other animals are motived by the same moral or mental influences that operate in man. While making no objection to attributing to the lower animals the capacity, for instance, for any kind or degree of *self-sacrifice*, they refuse to associate therewith any sort of *moral merit*; and, as a corollary, they do not recognise *demerit* in actions of an opposite kind. They resolutely oppose, in a great variety of ways, all supposition of moral merit in the actions of the lower animals just because they are lower animals, and on no other ground apparently. Thus—

1. They deny that, in actions involving self-sacrifice, the animals that sacrifice themselves have any true consciousness or perception of the nature of their acts; that such actions are voluntary and deliberate; or that they are the result of anything like *human motive*.

2. By regarding the lower animals as mere automata, they get rid of all such difficulties, referring self-sacrifice and other beneficent actions to 'instinct.'

3. They attempt all manner of *restricted definitions* of such terms as *morality*, *religion*, *motive*, and so forth, so as, if possible, to exclude all other animals from participation in attributes which they fondly regard as peculiar to man.

But such objectors to granting to other animals credit or merit for actions that in man would meet with the highest

praise are apparently ignorant of the dilemma in which they place themselves by all such futile efforts to distinguish the lower animals—morally or mentally—from man. In so far as they make good their case against other animals—and it is quite easy to make out a good case, seeing that there is so much, on the one hand, that can never be *proved*, and, on the other, that can never be *disproved*—they make out an equally good case against countless numbers of their fellow-men. For the general scope of the present work is to show how *superior* certain animals are to whole races or classes of mankind, both morally and mentally, and how essentially alike moral and mental influences and operations are in man and other animals.

Even *in man*, and in regard to the display of some of his supposed highest moral virtues, it is difficult, if not impossible, always to determine the presence or degree of moral merit. Thus *self-devotion* may be the result of free choice, of mere custom, of imitation, of impulse, of compliance with the inevitable—that is, of compulsion (Houzeau). In other words, self-sacrifice is not, even in man, necessarily associated with moral merit of any kind or degree. The man or woman who commits impulsively what is called a *heroic* act of self-sacrifice may have done so without prior consideration as to the nature of the act, without reflection as to its results, without deliberation. In all probability reflection, deliberation, or consideration would have deterred, not incited, to action; would have begotten a selfish over-cautiousness rather than a generous, uncalculating rashness.

It is an act of *self-sacrifice* on the part of a female ant when she destroys the means of coition in order to devote herself to the rearing of the young of other individuals of the species. It is impossible, however, in such a case to prove the presence or operation of consciousness, or knowledge on her part, of the nature and object of her act—of intention or purpose, of choice of celibacy, of reasoning or reflection, of moral merit. The phenomenon requires thorough investigation to determine whether, in the first place, for instance, it is common to all the females of a certain rank or caste (Houzeau). The sacrifice of individuals for the general or public good in

ant expeditions is, however, distinctly *voluntary* (Houzeau), as is their persistent fighting or working when wounded. For these phenomena are not uniform or invariably exhibited; wholesale self-sacrifice is exhibited only upon important, exceptional occasions—*e.g.* when the nest is threatened (Houzeau).

Rescue from peril—of man, or of each other—whatever the risk to, and frequently at the sacrifice of, their own lives—must present a difficulty to those who would explain away all the magnanimous actions of the lower animals by referring them to 'instinct.' No doubt the waste of life which is frequently involved in *self-sacrifice* may be regarded as a kind of *stupidity* or its result, in so far, for instance, as it is needless or unsuccessful. But the very same argument applies to many of the sacrifices of man himself. In rescue from drowning by the dog we have not only courage, with prompt, impulsive action, but also appreciation of danger, sympathy with the peril of others, overcoming natural timidity of water or love of life, and frequently the most genuine self-sacrifice, in the same sense in which such a term can be applied to the noblest actions of man. It makes its sacrifice knowing the risk, fearing the pain, and clinging to life (Cobbe).

When the collie or terrier, which are not water dogs, jumps into the sea or a river to save life, recover property, or simply to obey the behest of its master, its natural dislikes are overcome by stronger feelings, such as affection or sympathy; in some cases it may be simply by obedience, discipline, the dread of punishment, or hope of reward.

Man's interpretation of animal motive here again crops up. If he admit or assign a motive at all, it is almost sure to be an ungenerous or erroneous one. Man, and especially hypercritical man, does not give the dog, in life-saving by it, credit for the best but the worst motives; or he is foolish enough to attribute its action to mere instinctive impulse. He ascribes in it the practical virtue of *generosity* to the mere giving away of what is not valued or required, or of what does not belong to it—for instance, in the case of superfluities of food or booty—or to a desire for mere physical comfort—pure selfishness (Houzeau). And all these forms of generosity may occur

among other animals, just as they do so very certainly and commonly in man. There can be no doubt, however, that frequently, if not generally, the generosity of the lower animals, where it exists, is of a higher, purer kind.

Tocque monkeys nurse each other or human children (Cassell). This may be the result simply of *imitation* of the behaviour of human female nurses or ayahs; but we know full well that in countless other cases, whatever be the case in the Tocque monkey, the *nursing* of animals by each other involves the very highest moral and mental qualities—affection, devotion, self-sacrifice, disinterestedness, vigilance, foresight, and so forth.

Intercession in combat may sometimes, as is alleged, arise from a selfish motive—for instance, in the case of a hen, from the risk of injury to her young (Houzeau). But, on the other hand, we know that many animals have *compassion* for suffering; and there are many cases of mediation in which there is no room or ground for the ascription of selfish motives.

Conciliation of man by animals, we are told, may spring from a knowledge of the advantage of man's friendship in the bestowal of food and the affording of protection and shelter—in other words, from a selfish motive. And there is no denying and no disposition to conceal the fact that *selfishness* rules among other animals just as it does among men—certainly not more so. They are not all virtue; there is a due blending of vice. But conciliation may arise from other causes or motives—for instance, and much more probably, from the necessity for loving and of being loved in return.

Again, it is alleged that their *love of knowledge*, where it exists or is implied—for instance, in their inquisitiveness—is for *selfish* ends. That this may frequently be the case is quite probable. In what proportion of mankind, however, can it be said that the desire for knowledge has any higher motive? Is it not in man the conviction that 'knowledge is power' that leads most usually to its acquisition by him? Love of knowledge *for its own sake* is obviously peculiar to the higher races in man, and to the most highly endowed individuals of these races.

Hospitality may have a very definite purpose in view, as in the case of a dog which, having been seriously assaulted by a larger one, and being desirous of revenging itself on its adversary, gave a dinner from its own saved-up rations to a number of guests, in return for which they gave their services, which consisted in the worrying of the obnoxious bully (Macaulay). The sagacious sufferer here offered a bribe or reward beforehand for certain required services; there was prepayment of service, appreciation of reward, knowledge of the efficacy of a bribe, selection of the proper kind of bribe, self-denial in saving half its rations for a length of time, providence in storing this half for a future definite use, formation of a plan of action, and communication to others of its wishes and ideas. It cannot be affirmed that man's hospitality is always or generally determined by such satisfactory reasons, or that it developes or is the outcome of as high traits of moral or mental character.

The *interest* which social animals take in each others' affairs or operations, ordinary or extraordinary, or which the dog, monkey, or other animals take in the doings of man, may be mere *curiosity*; and we know that curiosity exercises a frequent and powerful influence among the lower animals, as in man. But it is obviously not mere curiosity that induces the mother fox to sit quietly, complacently, and gravely contemplating the sports of her young (Houzeau); nor can curiosity have any influence in leading the dog, horse, elephant, or other working animals to take a *professional interest* in their work.

When a dog voluntarily shares its master's prison it may be actuated not by *sympathy*, but by mere love of his society, attachment to his person, and dislike to be separated; and a mere love of companionship may also be suggested as the motive that leads free birds voluntarily to imprison themselves with those which are caged.

It has been contended that what other animals do is the *expedient*, not the right; and that this is sometimes the case there is no reason to doubt. They deliberate, as man does, whether a contemplated act will be profitable or safe, they balance probable ultimate pains against certain immediate pleasures, and they act according to the degree of their self-

control, on the one hand, and of their temptation on the other, too frequently seeking present gratification and disregarding ulterior punishment. But that they do not always select the expedient, and that they *can* do the right in the face of apparent inexpediency, is shown by countless instances of devotion to the death. Or we are told that right and wrong action may be, and perhaps generally is, determined by *fear* of punishment or expectation of reward. Unquestionably it frequently is so, but not more frequently so than in man—in all probability not so frequently.

By those who deny human virtues to the lower animals we are told that *duty* in the dog, or what is called duty, is only a shadow thereof and the offspring of fear. No doubt in some, or it may be in many, cases this holds good. But the more closely the subject is studied in man, the more will the unbiassed student be compelled to admit that in him too duty is frequently the result to some degree or in some form of fear—fear of suffering from the consequences of neglecting it. There is no good reason to doubt, however, that, equally in the dog and in man, the dominant or sole motive in duty or sacrifice is, sometimes at least, disinterested affection.

If it be urged that a dog may know that an action is forbidden by its master without necessarily knowing that it is in itself in any true sense wrong or immoral, the answer is that to discuss such a point would involve a quibble of words, and that there can be no doubt that the only idea possessed by many savages, by children, by many idiots and lunatics, by criminals and others of the uneducated classes of every civilised community, of wrongfulness of action or *wrong-doing* is that it is prohibited, *forbidden*, in some way by fellow-man. Both other animals and men know that certain actions are wrong, in the sense at least that they deserve and will bring *punishment*.

Man's errors of interpretation of animal motive are such that moral merit may really be greatest where it appears, in his estimation, to be least. For instance, the dislike in a really brave and magnanimous dog to fight with another that is not in any sense its 'match' may lead to apparent *cowardice*, when there is really a display of wonderful forbearance.

I can scarcely conceive the possibility of so *defining* morality, morals or the moral sense, moral responsibility, and religious feeling as to exclude the lower animals from participation in the possession of these qualities. The probability at least is that any ingenious definition that could be so framed as to exclude these animals would also exclude whole races and ranks of mankind. Philosophers are constantly guilty of the folly of basing their psychological definitions on faculties, feelings, or phenomena that occur in the most highly cultured individuals of the most highly-civilised human races. Their moral sense is that of the moral philosopher, their religious feeling that of the Christian theologian.

However man may view the subject, certain of the lower animals themselves have an obvious sense of personal *merit or demerit*, and they show this feeling in a great variety of very practical ways. The dog shows its consciousness of having performed some praiseworthy act by looking for approbation and reward, or of evil-doing by confessing its guilt and preparing either for punishment or its evasion. It is proud of a noble action and ashamed of a mean one. It exhibits equally its satisfaction at successful defence or the salvation of life or property, and its shame at theft, especially if caught *in flagrante delicto*. It submits to punishment that it feels it has deserved, but protests against suffering for a crime it has not committed. The feeling that it deserves praise, credit, or reward leads also to self-applause or *self-approbation* in the dog (Watson). As is elsewhere shown, the dog, horse, mule, elephant, and other animals attach a *value* to their work. They form an estimate, and a generally correct one, of their *deserts* or *rights*, upon which they sometimes insist if they are not duly recognised by man.

All evidence goes to show that moral merit and demerit must, along with virtue and vice in general, be conceded to the lower animals in common with man. It is not easy, no doubt, to determine what precise amount or degree of the said merit or the reverse they deserve in connection with given actions; but the very same kind of difficulty occurs incessantly in regard to *man himself*.

CHAPTER IV.

MORAL RESPONSIBILITY.

It has been shown in other chapters that certain animals—

1. Possess a sense of *right and wrong*—
2. With a power of *choice* between them.
3. Commit *crimes*, and are aware of the criminality of their acts.
4. Have a wonderful power of *self-control.*
5. Possess not only a moral but a *religious* sense, including a *conscience.*
6. Have a knowledge and dread of *consequences.*
7. Can *deliberate and decide* on proposed courses of conduct.
8. Have freedom of *will*, the faculty of *voluntary* action.
9. *Balance* or weigh present or immediate pleasures against prospective pains.
10. Appreciate *rewards* and *punishments.*
11. Perceive and correct their own *mistakes*, as well frequently as those of man.
12. Have a knowledge of *duty* or trust.

Such moral and mental qualities seem to me necessarily to imply or involve moral *responsibility.* Various writers experience no difficulty in conceding such a psychical quality to certain of the lower animals.

Practically man in a variety of ways recognises animal responsibility. He does so, for instance, in all forms of training or education which are based on the application of the principle of *rewards* and *punishments*, and on certain of the moral or mental qualities immediately above enumerated. It is recognised more conspicuously and directly in the judgment of

animal crime by human tribunals. The accountability of other animals for their acts, when these acts injuriously affected man, was the basis of numerous trials by the earliest human lawgivers, who judged and punished animals for crimes or misdemeanours just as they did man himself. Human laws, ancient and modern, practically acknowledge animal responsibility in animal crime. Thus the old Jewish law, as given in Exodus (xxi. 28–32), punishes an ox by stoning to death that fatally gores a man or a woman, and not the master to whom it belongs, unless the animal was by habit and repute vicious and he took no means to prevent accident to man from its viciousness. 'A horse whose master had taught him many tricks was tried at Lisbon in 1601, found guilty of being possessed by the Devil, and was burnt' (Draper). In more modern times the shepherd's dog has repeatedly been condemned to death and executed in Scotland for sheep-stealing (Low).

Animal responsibility was apparently recognised also in the *baptism* of animals in the thirteenth century (Pierquin), as it has been in admitting them as *witnesses* at law in human courts of justice. Dogs have appeared as witnesses in murder cases not only in the Middle Ages (Pierquin), but so recently as 1872 in Dundee; and their evidence has not unfrequently been accepted as conclusive—for instance, in the detection and recognition of murderers.

Moral responsibility seems, moreover, to be involved in at least many of the *practical jokes* practised, either on each other or on man, by the lower animals. In the cases referred to, as is more fully pointed out in the chapter on 'Practical Jokes,' there is deliberate malice or intentional mischief, self-amusement at the expense of another or the gratification of revenge or other passions, a perfect knowledge of results, a cruel glorying in the sufferings of fellows. When a parrot deliberately, for its own delectation, sets a cat and a dog by the ears, or causes a whole party of travellers to stop a railway train and get out to look for a child that was supposed to have fallen under the wheels, or makes a servant maid or waiter attend to a fancied summons from a master or lodger, the animal must be held as,

CHAPTER IV.

MORAL RESPONSIBILITY.

It has been shown in other chapters that certain animals—

1. Possess a sense of *right and wrong*—
2. With a power of *choice* between them.
3. Commit *crimes*, and are aware of the criminality of their acts.
4. Have a wonderful power of *self-control*.
5. Possess not only a moral but a *religious* sense, including a *conscience*.
6. Have a knowledge and dread of *consequences*.
7. Can *deliberate and decide* on proposed courses of conduct.
8. Have freedom of *will*, the faculty of *voluntary* action.
9. *Balance* or weigh present or immediate pleasures against prospective pains.
10. Appreciate *rewards* and *punishments*.
11. Perceive and correct their own *mistakes*, as well frequently as those of man.
12. Have a knowledge of *duty* or trust.

Such moral and mental qualities seem to me necessarily to imply or involve moral *responsibility*. Various writers experience no difficulty in conceding such a psychical quality to certain of the lower animals.

Practically man in a variety of ways recognises animal responsibility. He does so, for instance, in all forms of training or education which are based on the application of the principle of *rewards* and *punishments*, and on certain of the moral or mental qualities immediately above enumerated. It is recognised more conspicuously and directly in the judgment of

dangerous habits, or the non-correction of such habits when developed; by neglect of proper education or by vicious training; by the direct encouragement or non-repression of such propensities as biting or worrying—the master renders himself—and very properly—liable by most laws for the damage done by his dog or horse. By modern British as well as by ancient Roman and Greek law man is held responsible for the doings of the domestic or other animals which he possesses (Pierquin). Thus he is answerable for the acts of eccentric, dangerous, vicious, ill-tempered, insane, or rabid animals of which he is the owner; so that the mere ownership of such animals as the dog, horse, elephant, cat, or monkey is in itself attended by a considerable measure of—it may be troublesome and expensive—*responsibility*.

It may be regarded as some sort of justification for including or associating the punishment of the animals in or with that of their masters that, had the thievish collies, for instance, been spared, there might have arisen a difficulty or impossibility in eradicating their vicious habits, the presumption being that the unfortunate dogs would never have forsaken their evil courses while health and strength were left. And such a presumption is strengthened by what we know of the force of *habit* or discipline in the lower animals, as in man, whether for evil or good. An amusing story has been told by William Howitt and other writers of a highwayman's horse which knew and played its part well while it remained a highwayman's horse, but which, when sold to an honest man, showed the influence of its former bad habits, the result entirely of man's training, by leading him *nolens volens* into the most awkward predicaments. But, on the other hand, it is impossible to say what might have been achieved by systematic kindly efforts at *reformation* in the case of dogs and horses trained for their special purposes by sheep-stealers and other classes of thieves, robbers, brigands, or smugglers. The chances of reformation and the advantages of reformatories are quite as great or as small in the case of animal as of human criminals.

We know that in man *criminals* have certain mental characteristics, certain moral defects (Bruce Thomson). They

may fitly be spoken of as a race or breed by themselves—a race or breed morally and mentally defective. The same would be the result, according to the law of heredity, were man artificially to breed animals with a special aptitude to some particular vice—say, theft. The hereditary transmission of a criminal disposition or tendency in the sheep-stealing dog is as certain or as probable as is the inheritance —whether in man or other animals—of any other parental peculiarity—mental, moral, or bodily. So that man incurs necessarily a very grave *responsibility* when he either trains, encourages, or permits subject animals to indulge their natural or acquired vicious propensities for theft, murder, assault, or destructiveness.

Whether or not man assigns to, or admits in or for, the lower animals any kind or degree of moral responsibility, these animals themselves have—in connection, for instance, with the discharge of *duty*—notions of responsibility or accountability. Not only so, but they apparently recognise both responsibility and irresponsibility in their offspring and their fellows, as well as in other species and genera, including man. Thus they distinguish mental defect in their offspring, and make the proper allowance for all its disabilities. The dog that is the playfellow of the human child or infant appears to recognise the irresponsibility of the latter for its thoughtlessness, its incapacity for proper behaviour; and the result of such a measure of discrimination is wonderful forbearance under the teasing or provocation to which the lower animal is sometimes habitually subjected by its cruel little human tryant. The dog submits quietly to treatment from a child that it would at once resent from an adult.

There is a voluntary assumption of responsibility in foster parentage.

In health and in ordinary circumstances certain animals can prevent, control, or direct given courses of conduct or action; but there are forms or states of mental *disease*—for instance, insanity, and exceptional mental conditions, such as *fright* or panic—in which self-control is lost, and their responsibility for the resultant action becomes, or should become, either absolutely or partially removed. There are, in

short, just as in man, *degrees* both of responsibility and *irresponsibility*. Sportsmen, for example, have to recognise the non-accountability, by reason of mental defect, of particular dogs of a breed, which show unusual characteristics, such as conspicuous want of pluck and sagacity. Their occasional total or partial *irresponsibility*, the abolition or suspension of responsibility, must be recognised or determined on precisely the same sort of grounds as in man. The absence of the moral sense in many human criminals leads medical jurists, for instance, to regard them as 'morally irresponsible, no matter how great the crime against society.'[1] Equally in man and other animals, then, the presence or absence of this moral sense must determine the measure of responsibility or irresponsibility.

One of the attributes of the Andaman Islanders, according to travellers, is their *moral irresponsibility*; and similar irresponsibility, in the absence of any proper moral feeling, may be said to be attachable to other savage races in a more real sense than that in which certain of the higher animals—such as the sheep-stealer's, poacher's, brigand's, smuggler's, or highwayman's dog—can be said to be non-responsible.

In judging, for instance, of the degree of responsibility or irresponsibility that is attachable to animals in a state of rage or fury, created by man, due consideration must be given to the kind and amount of *provocation* to which they have been subjected, as well as to the natural character of the animals themselves and the kind or amount of their education. In the great majority of instances—as has been already stated—*man* is, and ought to be held, responsible for the *accidents* that arise from the behaviour of the animals subject to his management, or more frequently his mismanagement. The master — not his instrument — should generally be punished for the illegal or punishable offences of the animals in his possession or under his control, though in so far as an animal itself takes part in a procedure which it knows to be wrong, or illegal, or forbidden, and gets some share in the benefit—is not a mere tool or instrument—it may be held *pro tanto* responsible.

[1] Reviewer in 'London Medical Record' of May 1875.

Man's responsibility for the results of *animal insanity* is clear in such cases as the *artificial* panic produced among horses by human thieves at the fairs of Normandy, as mentioned by Pierquin. These panics—intentionally produced by irritants diffused in the air or otherwise—were the source of direct, immediate, and obvious danger, not only to the animals affected themselves and to other animals exposed at the fair, but to all mankind who constituted the crowds so usual on such holiday occasions. Again, moral turpitude, whether it is rightly or wrongly attached to the dog that co-operates with the poacher, sheep-stealer, smuggler, brigand, or thief, certainly pertains to the man who systematically teaches the animal to become his accomplice in acts which the man at least knows to be unlawful and punishable. The poor dog is urged, enticed, bribed, instructed, compelled by its master to commit or to take part in the commission of illegal acts. The merciless biting and worrying of persons or other animals—especially sheep—by collies or other dogs —a propensity that may be natural or morbid—is only too frequently the result of man's evil training or evil usage. The relentlessness of the bloodhound is another effect of education by man (Lewes). Incompetent masters have to answer for the misinstruction of sporting dogs, as injudicious trainers have for the vicious faults of character or temper attributable to undue severity in breaking (Walsh).

Man's responsibility for the misdeeds of domestic animals belonging to him is recognised in the earliest laws of the ancient Hebrews. Thus we have in the twenty-first chapter of Exodus [1] regulations made by Moses for the punishment of masters who wilfully or knowingly keep an ox that is addicted to fighting or goring, while in certain events the ox itself was so far held responsible that it was punished by being stoned to death or otherwise. In other words, a master was chargeable with murder who was possessed of an ox that fatally gored a man or woman, if he was previously acquainted with the animal's propensity, while the offending ox itself was also punished for what was held to be murder. The *penal codes* of various countries and ages, jurisprudence both

[1] Verses 28–36.

ancient and modern, but ancient perhaps even more than modern, have held man responsible for a great variety of results of the acts of animals of which he is the possessor or custodier. *Man's responsibility*, for the results to other men at least, of the vices or viciousness of animals belonging to him as property may indeed be said to have been recognised by or in the laws of all civilised countries throughout the world and in all times. They have inflicted *penalties* on man for a great variety of acts of mere *neglect* or indifference as well as of cruelty, for faults of *omission* as well as of commission, for the non-exhibition of sympathy or mercy, the withholding of aid, as well as the wanton cruelty of children or adults. The Athenian Areopagus showed a good example, and taught salutary lessons to all subsequent ages and to all other countries, in its exposure and punishment of man's shortcomings in duty towards the lower animals. Thus the ancient Athenians punished those who either excited their dogs to bite or did not restrain them from biting.

Considering the evils to the animals themselves, no less than the danger to human life it is liable to produce, all needless and intentional *excitement*, irritation, provocation, torment, or torture of animals by man should be held as a legal offence on his part. Illustrations of the results of such excitement or provocation, or of man's being held responsible by fellow-man for the actions of animals belonging to him, are to be met with constantly in our petty law (police, justice of peace, sheriff, or other) courts, where injury from dog-bites, accidents from restive horses, damage to property from stray cattle, are the common subjects of judicial examination and punishment.

It is but just, for instance, that man should be held fully responsible for the results of *insanity* or other *disease*, or of *vice*, developed at any time prior to the sale of the animal, in a horse or a dog belonging to him, of which insanity the master was quite cognisant, and which disability indeed it was that led to his parting with the affected animal, knowing that one attack was likely to be followed by others of increasing severity or duration. It is proper he should suffer for concealment of the fact that an animal labours under

serious defects of character, brought about very likely by his own improper usage. It is even righteous that farmers should suffer loss by the decimating animal diseases that result from their own neglect, ignorance, prejudice, or superstition. Unfortunately the innocent must suffer with the guilty in such cases. The farmer makes up his losses by the overcharge of the public, to whom, moreover, he is only too apt to supply bad flesh, milk, butter, and other animal produce—infected produce, in other words, that is the source of boundless misery and disease in man. It is a popular saying that 'all is fair in love and war,' to which may be added horse-dealing. It has occurred to myself when, purchasing a pony, I had trusted the assertion of the seller that it was free from all faults of character—to find, when too late, that it had been quite notorious for its temper and its tricks, and to be told by a certain army general, who was himself the very soul of honour, that a man might be a gentleman in everything save horse-selling. In the eyes of every honest man, however, as well as, it is to be hoped, in the eye of the law, the man who palms off a vicious, dangerous horse or dog as an inoffensive one is a rogue, and deserves the severest punishment of roguery, for he is indirectly the cause of much loss of human life, of much injury, many accidents, to his fellow-men. Where such losses of life occur he is virtually chargeable with homicide, and should be dealt with as a homicide.

CHAPTER V.

RELIGIOUS FEELING IN LOWER MAN.

An essential preliminary to a consideration of the question whether the lower animals possess what is entitled to be called or recognised as *religious feeling*, is a study of what is called the 'religious instinct' in man; but not in man of high or the highest religious culture. We must study the religious instinct in its *lowest*, not its highest manifestations, in its crude, not cultivated state; in—

1. The lower or savage races of man—
    a. The absence of all religion.
    b. Rudimentary forms of religion—

as well as in—

2. The higher or civilised races; in—
    a. Infants and children.
    b. Idiots and the insane.
    c. The criminal classes.
    d. Buddhists and other classes or races of atheists or pantheists.

Nor are certain considerations, based upon the condition of religion in adults of the educated and moral classes of the most highly civilised nations of the West, altogether irrelevant.

In the first place, missionaries and travellers in different parts of the world, and various writers on the natural history of man, tell us that there are, or were, certain savage races utterly devoid of any religious sentiment, sense, idea, worship, or observance. Thus the Rev. William Colenso, of Napier, New Zealand, says of the Maoris, when they were first visited by Europeans—a race with which I have myself

come in contact in the course of many wanderings—'Religion, according to both the true and popular meaning of the word, they had none. Whatever religion may be defined to be—virtue as founded upon the reverence of God and expectation of future rewards and punishments, or any system of Divine faith and worship—they knew nothing of the kind. They had neither doctrine nor dogma, neither cultus nor system of worship. They knew not of any Being who could properly be called God. They had no idols. They reverenced not the sun, nor moon, nor glittering heavenly host, nor any natural phenomena.'[1] Mr. Colenso happens to be not only a missionary but also a naturalist. As a missionary his bias would probably lead him to discover some germ of religion in this and every other savage race, did such a germ really exist; but as a naturalist he feels bound to represent facts simply as he finds them. His opinion as regards the New Zealanders is confirmed by a writer of a different kind—Edward Shortland—who thus writes of them: 'The great fact observable from a consideration of their traditions . . . . is that the people had no idea of a Supreme Being, the Creator of all things in heaven and in earth.'[2] Similar views are, or have been, held by some of the most eminent missionaries concerning the negative condition of religion in other savage races, and their testimony is of the highest importance in connection with the confident assertion so constantly being made in Exeter Hall that in *all men* the rudiments of religion, of a religious instinct, exist, and only require suitable cultivation and direction. The Rev. Dr. Moffatt, the veteran South African missionary, says of the Bushman (or Bosjesman), 'He knows no god; knows nothing of eternity.'[3] In his address on South African missions in Westminster Abbey, in November 1875, he said of the Bechuanas when he first visited them, 'They had no idea of a God, and no notion of a hereafter. There was not an idol to be found in all their province,' and one being shown to a chief, 'an intelligent leader of the people, it excited his

[1] 'Transactions of the New Zealand Institute,' vol. i. 1868, p. 385.
[2] *Ibid.* p. 329.
[3] 'Missionary Labours and Scenes in South Africa,' 13th edition, p. 15.

liveliest astonishment. . . . He ridiculed the notion of anyone worshipping a thing he had made with his own hands.' But, on the other hand, 'a printed book was regarded as the white man's charm.'[1] Dr. Moffatt's distinguished son-in-law, Dr. Livingstone, thus refers to the Makondé natives of the Rovuma district:—'They know nothing of a deity; they pray to their mothers when in distress; they know nothing of a future state, nor have they any religion except a belief in medicine. . . . They blame witches for disease and death. . . . They fear the English.' The Rev. Dr. Nixon, Bishop of Tasmania, was 'obliged to desist from all attempts at conversion, because the poverty of their language and conceptions rendered every higher religious idea impossible to them'—the aborigines of Tasmania. Dr. George Smith, formerly editor of the 'Friend of India,' endeavouring to claim for the Andaman Islanders 'a capacity for being influenced by Christian teaching,' is forced, with obvious unwillingness, to admit that such a capacity 'has been so lamentably wanting in the Nicobarese to the south, whom . . . . the Jesuits and Moravians successively attempted to influence in vain.' Regarding certain savage tribes of the Albert Nyanza region of Central Africa, Baker reports that the 'head of the Austrian mission acknowledged . . . . that the mission was absolutely useless among such savages . . . . that the natives were utterly impracticable' as to religious impressions of any kind. Baker himself found that 'the obtuseness of the savages was such that I never could make them understand the existence of good principle. Their one idea was *power*—force that could obtain all, the strong hand that could wrest from the weak.'

These experiences and opinions of missionaries are abundantly confirmed by the concurrent evidence of travellers, naturalists, sportsmen, and merchants, all intimately acquainted with the habits both of thought and action of the savage races among whom they dwelt, or with whom they became for the time associated. Of the natives of Dahomey Lieutenant Ellis thus expresses himself in one of the leading religious publications of this country:—They 'have no idea

[1] 'Daily News,' December 1, 1875.

of God. . . . They believe also in no future state of rewards or punishments proportionate to their behaviour on earth, which belief has always been found to be the germ of civilisation. . . . Christianity has made scarcely any progress.'[1] Of one of the jungle Veddas of Ceylon Hartshorne tells us, 'He had no idea of a soul, of a Supreme Being, nor of a future state. He thought there was no existence after death. He was conscious of no difference between himself and the wild beasts which roamed through the forest.' As a whole they 'appear to be almost devoid of any sentiment of religion, except in so far as may be inferred from their offering a sacrifice to the spirit of one of their fellows immediately after his decease.' The author of one of the most recent and comprehensive works on Ceylon, 'an officer late of the Ceylon Rifles,' says of these Veddas, 'They know nothing of heaven or hell, or any kind of future existence.' Nevertheless, 'so far from being savage, they are mild and inoffensive. . . . Missionaries would be much better and more usefully employed *at home* in reclaiming the *worse than wild beasts* in human shape among ourselves. Veddas do not exhibit any of the brutal, drunken ruffianism of the *civilised savages* who infest our towns, bite people's noses off, or kick their wives to death, and (these Veddas) are by far the most civilised of the two.' This contrast between the native character of the so-called *savage*, who has not yet been subjected to the influences—too frequently contaminating and deteriorating—of civilisation, and the behaviour of whole classes of men and women in cities that superabound in churches and in clergymen, has frequently been made by the most competent authorities, and cannot be made too frequently or too strongly.

Of the negro of Angola Monteiro remarks, 'He has no idea of a Creator, nor of a future existence. Neither does he adore the sun, nor any other object, idol or image. His whole belief is in evil spirits and in charms or fetiches.' Kamrasi's people, near the Nyanza Lake, 'although far superior to the tribes on the north of the Nile in general intelligence, had no idea of a Supreme Being, nor any object

[1] 'Religious Rites in Dahomey,' *Sunday Magazine*, vol. for 1876, p. 550.

of worship, their faith resting upon a simple belief in magic, like that of the natives of Madi and Obbo. Although without an idea of a Supreme Being, the whole country bowed down to sorcery . . . . utterly devoid of a belief in a deity and without a vestige of superstition,' says Baker. After recounting a long conversation with a certain chief, the object of which was to bring out any glimmer of a religious sense, Sir Samuel is obliged to confess, 'In this wild, naked savage there was not even a superstition upon which to found a religious feeling. There was a *belief in matter*, and to his understanding everything was material. It was extraordinary to find so much clearness of perception combined with such complete obtuseness to anything ideal.' Baker had, in fact, to give up 'the religious argument as a failure.'

Of the Andaman Islanders, Dr. Mouat says, 'They have no conception of a Supreme Being. They have never risen from the effects they see around them even to the most imperfect notion of a Cause. They have never ascended in thought from the works to a Creator, or even to many creators—that is to say, polytheism.'[1] Lieutenant Low, of H.M. Indian Navy, similarly remarks of them, 'They do not believe in the existence of a Supreme Being, and perform no religious ceremony of any sort.'[2] Again, according to the evidence of the French castaway Narcisse Pellier, who lived seventeen years among them, the blacks of Night Island, on the N.E. coast of Queensland (Australia), 'have no knowledge of any Superior Being and no form of religion of any kind whatever.' Indeed, 'the Australian has no words to express the ideas of God, religion, righteousness, sin;' and 'there are numerous examples of savage nations . . . . who have no words in their language to express such ideas' (Büchner).

In short, Lubbock points out how ample and varied is the evidence that goes to show 'that there are races of men altogether *devoid of religion*,' and that 'the question as to

[1] 'Adventures and Researches among the Andaman Islanders,' 1863, p. 303.

[2] 'The Land of the Sun: Sketches of Travel,' 1870, p. 168.

the general existence of religion among men is . . . . to a great extent a matter of *definition*.'

While, however, there are certain savage peoples that appear to have, absolutely or comparatively—

1. No ideas of a God or of gods, of a Deity, Divinity, or Supreme Being, of any Creator of or Ruler over the universe;
2. No notion of any future state of existence, of any spiritual survival of death;
3. No worship, and—
4. No idols, images, or other objects of worship;
5. No faith or belief except in the material, in what is visible, tangible, demonstrable, cognisant to and by the senses;
6. No priests or spiritual order;
7. No superstition;
8. No tradition—

there are many more that possess either some *equivalent for* or some *rudiments of* religion—in the form, for instance, of—

1. *Worship* of—
   - *a.* Fellow-man.
   - *b.* The lower animals.
   - *c.* Inanimate objects, including—
     1. Trees, plants, or leaves.
     2. Rocks or stones in their natural state.
     3. Water, as that of the ocean or rivers.
     4. Articles fashioned by man.
   - *d.* Natural phenomena, including—
     Fire.
     Thunder.
     Sun, moon, and stars.
   - *e.* Imaginary spirits, good and evil.
2. *Faith* or belief in—
   - *a. Power*, real or imaginary, embodied or not, for good or evil, including the
     Superstitions of sorcery.
     witchcraft.
     magic.
     charms.
   - *b.* A *future* state of being, whether of happiness or the reverse.

The *worship of man* by his fellow-man is and has been prevalent in all ages and in all countries, in all degrees or stages of savagery, barbarism, and civilisation. In the first place, as regards the *savage*, he worships, from different motives to a certain extent, on the one hand his own chiefs, and on the other the white man. A certain African tribe of the Nyanza region 'believed most devotedly that the general affairs of life and the control of the elements were in the hands of their old *chief*; and therefore they served him, not with a feeling of love, neither with a trace of religion, but . . . . for the sake of what they could obtain' (Baker). 'The negroes of Dahomey, as elsewhere in West Africa, considered *white men* as beings but little inferior to deities' (Ellis), and the explanation of this is probably to be found in the statement by another traveller that 'nothing impresses savages so forcibly as the *power* to punish and reward' (Baker). According to Spencer, indeed, the savage first shows the religious sentiment 'in the feeling excited by the display of power in another, exceeding his own power—some skill, some sagacity, in his chief, leading to a result he does not understand—something which has the element of *mystery* and arouses his *wonder*.' Livingstone has described the worship of the white traveller by various African races. 'The white traveller commands a kind of worship. The sick lie down in his shadow to be cured; the young women ask permission to touch his strange skin and his wonderful hair.'[1] Houzeau points out that the deities of other primitive peoples, such as the Society Islanders, are also only men.

But the recognition of brother man as a superior being is by no means confined to savage races. Buddha, the founder of the Buddhist religion, was himself worshipped as a god, and the same was no doubt the case with Mahomet. 'At the close of a cholera epidemic in Ceylon, in 1875, certain Buddhist priests from Burmah paraded through Galle in a wheeled pagoda, 'the people adoring them as gods;'[2] and the 'Deification of the Prince of Wales in

[1] 'Athenæum,' December 19, 1874, p. 822.
[2] 'Sunday Magazine,' November 1875, p. 143.

India' in the course of the same year was the subject of an article in the 'Athenæum.'[1]

In the various forms which *hero worship* takes, the *deification of man by man* is daily illustrated by the most refined individuals of the cultured classes of the most highly civilised nations, and has been so illustrated in all times. Such is the admiration of *excellence* of any kind that many ardent men and women worship its human embodiment or incarnation. Hence they make divinities of poets or novelists, theologians or philosophers, sculptors or painters, soldiers or sailors. The Rev. Dr. Chalmers, for instance, speaking of Rousseau, says, 'Nor were there wanting many admirers who worshipped him while he lived and who, when he died, went like devotees on a pilgrimage to his tomb.'[2] Arnold spoke of the 'all but idolatry' with which he regarded Bunsen; and there are hosts of young men who make a god of Carlyle or Ruskin, Darwin or Huxley Shakespeare or Tennyson, Landseer or Millais. In all such cases there is still a *respect for power*, but it is no longer for mere physical strength; it is a reverence for, or an adoration of, intellectual ability, artistic skill, or moral force.

The obvious *worship of man by woman* which characterises our own civilisation is interesting as illustrating the *sense of dependence*, on which, according to Schleiermacher and other authors, religion is mainly based. 'The mere feeling of dependence on a superior being' is the 'lowest and simplest form of religion,' says Professor Blackie. In endless ways our most highly educated women show that they have such a feeling for their husbands, fathers, sons, brothers, or for, in general, men as men. They lean upon and cling to them in such a way as to manifest their evident consciousness of man's superiority, and superiority not simply as to physical strength. They have faith in his superior wisdom, and they look up to him for guidance in all the more serious affairs of life. Nay, they frequently go so far as to make a veritable idol of him, and worship him with a devotion and intentness worthy of higher objects of reve-

[1] Of February 19, 1876, p. 264.

[2] 'Lectures on the Epistle to the Romans,' 1854, vol. i. p. 237.

rence; and they do all this nothwithstanding sometimes their assertions to the contrary. For it has occurred to me over and over again to observe, both at home and abroad, that members of what has been not undeservedly called by the press 'the shrieking sisterhood' of masculine females clamorous for women's rights—strong-minded women who, without respect to facts, assert woman's mental, if not physical, equality with man—constantly betake themselves in all matters of difficulty to masculine support, advice, or assistance. Nay, I have seen women who were philanthropists—literally, figuratively, and professionally—carry their doubtfully Platonic admiration of man the length of despising their own sex. It is shown in another chapter that throughout the animal kingdom where mind exists at all there is, as a rule, a sexual psychical distinction, the female mind being *inferior in strength* to the male. And it may here be added that a sense of dependence on that superior mind, as well as superior body, of the male is, or may be said to be, throughout the zoological series a natural attribute or instinct of the female.

Woman's idolatry of man was long ago pointed out by Milton where, speaking of Adam and Eve, he says—

> He for god only; she for god in him.

In our own day George Eliot portrays the same thing in 'Daniel Deronda,' the Jewish youth who is 'in the stead of a god' to a woman; and another of the best of our modern English novelists—Mrs. Craik, better known as Miss Mulock—referring to self-sacrifice, remarks, 'Many a strong-minded, noble-minded *man* becomes a sort of *conscience* to many a weak woman, who regulates all her doings, not by *abstract conceptions of the right*, but by what he—husband, or brother, or father—*thinks right*. This is a practical worship of a kind that is extremely common among ourselves, and a worship infinitely better in many cases than none at all. In such cases *weakness* must find something *strong* to lean upon and be supported by—as much so as the long, trailing, weak tendril of the climbing plant searches for until it finds the needful *support*.'[1]

[1] 'Sermons out of Church,' 1875, p. 10.

On the other hand, the *deification of woman by man*, or what is tantamount thereto, is not uncommonly seen among our most highly cultured classes. The writings of the poets in all times, indeed, have abounded in evidences of this sort of adoration. And even philosophers of the driest type are not exempt from so tender an idolatry. Of this there is perhaps no better modern instance than that of the late John Stuart Mill, who thus speaks of his own wife: 'Her memory is to me a *religion*, and her approbation the standard by which—summing up as it does all worthiness—I endeavour to regulate my life.'[1] Thus he may be said to have made a goddess of his wife. And, though not to the same extent, or in quite the same sense, there are hosts of other men of culture or refinement who make divinities of wives, mothers, daughters, sisters, or beloved. This worship of woman by man, however, differs in various respects from that of man by woman, or that of man by fellow-man. In this case also there may be a respect for power or strength, but never for mere bodily power or strength. Frequently, however, the source or cause of reverence, admiration, or adoration is physical *beauty*, sometimes pure and simple, more usually as associated with the *moral graces* or virtues—of love, gentleness, purity—and even with that feminine attribute that may or may not be considered a virtue—the sense of dependence, the attribute of weakness, already alluded to.

Nor must we, either in man or woman in civilised peoples of all ages, forget the many forms of *worship of the ideal*, of imaginary embodiments of the physical, intellectual, and moral virtues.

It is not either necessary or desirable to describe here the various forms of the *worship of natural objects or phenomena* by savage races—for instance, the fetichism of the West African tribes, or the shamanism of the Tungusians and Yakuts. But it is of interest to note that such a kind of worship is neither confined to Africa nor to savage races; for, on the one hand, it is to be met with in the Samoyedes and Laplanders of Northern Europe, and, on the other, among the in some respects highly civilised Chinese. Rae tells us that the Russian

[1] Autobiography, 1873.

Samoyedes of the present day, inhabiting the Kânim Peninsula or living in the neighbourhood of Archangel or other towns—within the pale, therefore, of European civilisation—worship, as 'noûmea,' or deities, gods or idols, bleached *reindeer skulls*, stuck upon sticks and fenced round with reindeer horns, as do also the Lapps. A Samoyede worshipper 'went down on hands and knees . . . . approaching the idol by crawling, prostrating his face and kissing the ground in supplication, exactly as the Laplanders approached their god Jumâla.'[1]

'Any natural object different from the common run of those which come before him is to the Siberian an object of worship, which not only the families in the neighbourhood, but tribes from a distance, will visit and make offerings to. A stone, a tree of irregular shape, a curious rock, may all be looked to by the shamanistic worshipper as material for his adoration' (Brown).

As regards the *Chinese*, 'they possess a kind of philosophical pantheism, an adoration of certain *natural objects*; but it is a mere ceremonial and associated with no theological doctrines.'[2] 'Respect for their *ancestors* seems, as Davis long ago remarked, about the only thing that approaches to the character of a religious sense among them, for throughout their idolatrous superstition there is a remarkable absence of reverence towards the idols and priests of the Buddhist and Taonist sects' (Brown).

The worship of *living animals* is so extensive a subject that we cannot here enter upon it further than to illustrate the feelings which give rise to it and the ceremonies by which it is attended in a single case. The poor natives of India look upon the man-eating tiger 'as a superior being, to be propitiated by prayer; and offerings of rice and fruit are left at the entrances of their cottages when its approach is dreaded. . . . Several natives came unexpectedly into the presence of a tiger. Being unarmed, they addressed a prayer to it for mercy.' Here, as in so many other cases of human worship,

[1] 'The Land of the North Wind; or, Travels among the Laplanders and the Samoyedes,' 1875, pp. 256-7.

[2] 'Chambers's Encyclopædia.'

we have obviously the *fear* of a superior *power*—the power to do evil, to produce death and havoc—leading to efforts at the conciliation of that power.

In the human infant or *child*, even of the most highly cultured man, there is *no innate religious sense*. It has, like the moral sense, to be *created and cultivated*.

Again, in certain forms of *mental defect and disorder*—in certain stages or kinds of idiocy, for example—in the midst of the highest civilisation, there is either no religious sense, or only the faintest glimmerings can be developed as the result of great pains in education. As was long ago pointed out by Shakespeare, the idiot worships his toy, makes an idol of manufactured wood or stone:

> The idiot takes his bauble for a god.

The phenomena of human *insanity* in the lunatic asylums of our large cities illustrate what may well be designated the *religion of fear* or its fruits, the influence of fear as an element in religion. Fear is an influence that may be said to pervade, or to form the basis of, many kinds or forms of religion or worship, superstition and its rites, not in savage races only, but also among civilised and semi-civilised peoples —fear, that is, of a power to do evil. But the acme of this fear is to be found in certain forms of what is called religious insanity. As a physician whose specialty is the treatment of insanity and allied disorders I have to encounter every day cases of poor nervous, timid, hysterical weaklings of both sexes, but especially young ladies, young women, or girls, whose life is rendered intolerable by religious delusions. A more pitiable class of patients I am not acquainted with; more abject wretchedness I cannot conceive. Their extreme mental misery very commonly impels them to suicide.

> Anywhere—anywhere—out of the world

is their constant cry and aspiration. And for what reason? Because they have constantly in their mind's eye what they believe to be the terrible realities of a physical hell. Everlasting fire and brimstone, a lake of fire worse than the crater of Kilauea or any of this world's active volcanoes, the worm that dieth not, have inspired a dread compared with which

any other kind of terror or horror is a bagatelle. And they feed this insane fear—it is fed for them—by all the Bible texts that relate to damnation, perdition, eternal punishment, wrath, and vengeance. To and by themselves personally all such texts are applied as to persons who have sinned beyond hope of mercy or forgiveness. Such are the common major morbid forms of religious fear—the major morbid results of fear as an element in religion.

But the minor forms and results are much more common —for instance, in Presbyterian Scotland—so much so as to taint or tone society in general.

In this and other highly civilised countries there are whole classes of people who are characterised either by a want of the religious sentiment or by its very low development even under education. This may be said, for instance, of—

1. The whole *criminal* class, as we meet with its members in our great prisons.

2. The *vagrant* class, including certain tribes or kinds at least of gipsies or tinkers, who are not necessarily or always criminal or vicious.

3. A large proportion of the lower or *uneducated* classes in all our large centres of population.

Thus of the cave-dwellers of Caithness Dr. Mitchell declared in 1866, 'They went to no church, and had no religious beliefs or worship.' The French peasantry of the present day, as their characteristics are sketched by Hamerton, exhibit the following among many other evidences of *superstition*:—'The women go on the Day of the Purification to read the Gospel to the *bees*. . . . I have seen this done, and done in serious earnest, with a perfect faith that the bees could derive spiritual advantage from the reading, and were at least so far Christians.'[1] And among the same peasants also there is still a belief in *sorcery*.[2] While of a class representing the average civilisation of the metropolis of the world Lord Lyttelton, in replying to Mr. W. R. Greg's 'Rocks Ahead,' remarks *à propos* of popular Christianity in the capital of England, 'What warrant have we for supposing that the

[1] 'Round my House,' 1876, p. 254. [2] *Ibid.* p. 256.

majority of men have the requisites for true Christian belief? Of the first hundred men we may count passing over Westminster Bridge how many are the least distressed by any sense of sin or of moral evil?'

In truth, the most highly educated class in Britain is charged with *atheism*, materialism, a faith only in what is demonstrable to and by the senses, a belief that is common to the savage and the child. Much has been said of late years of the *atheism of science*, or of its cultivators. Wordsworth thus describes the modern scientist, or man of science:—

> A moralist . . . . . .
> Himself his world and his own god:
> One to whose smooth-rubbed soul can cling
> Nor form, nor feeling, great or small:
> A reasoning, self-sufficing thing,
> An *intellectual* all-in-all.

'Here,' says Professor Blackie, the most genial genius of all the academic celebrities of the 'modern Athens,' 'the great philosophic poet clearly indicates that, without reverence and love, the mere man of science remains incapable of comprehending either humanity or divinity: becomes practically his own god.' But both philosophic poets—for the Professor is quite as well entitled to such a designation as Wordsworth, though his philosophy is of a warmer, more human and humanising kind—have before them an ideal, not actual, personage. A 'mere man of science' is much less likely to exist in reality than a mere poet. At all events I do not myself know any. All the men of science I have encountered abroad and at home are something more than mere men of science; they are men with all the ordinary human aspirations, virtues, and vices, including most assuredly the highest reverence and love for the good, the true, and the beautiful, wherever they are to be found. Poets as well as divines would appear to require constantly to be reminded that atheism and science have no necessary relation or connection; that *theology is not religion*, but only a part or form of it; and that devoutness and all the elements of religiousness and morality may exist with or without a belief in the God of the Bible, as that belief is set forth in this or that creed, dogma, or Church standard.

There is unquestionably in all ranks of civilised men, and in both sexes, a *self-worship*, the result of morbid or overweening self-esteem or self-conceit, and such persons, puffed up by a sense of their own importance, may be described as their own gods; but these divinities are to be sought in the ranks of Bumbledom, in public boards of all kinds, in Government offices, and not specially at least among men of science, who do not, however, pretend to be exempt from the frailties of their common humanity.

The *idea of deity* is not necessary to *religion*. No such conception as to the government of the universe or regulation of human affairs is contained in Buddhism, 'the most widespread religious system in the world.' 'The very idea of a God as creating, or in any way ruling, the world is utterly absent in the Buddhist system. God is not so much denied: He is simply not known. Contrary to the opinion once confidently and generally held that a *nation of atheists* never existed, it is no longer to be disputed that the numerous Buddhist nations are essentially atheist; for they know no beings with greater supernatural power than any man is supposed capable of attaining to by virtue, austerity, and science. And a remarkable indication of this startling fact is to be seen in the circumstance that some at least of the Buddhist nations—the Chinese, Mongols, and Tibetians—have no word in their languages to express the notion of God.'[1]

The modern German philosophy of Schopenhauer in many respects resembles Buddhism. It may, in fact, be regarded as a modified Western Buddhism, in which there is 'no religion . . . . except that of simple philanthropy and self-denial.'

It appears, then, that in—

1. Certain of the lower races of man;
2. Certain stages of development among higher races;
3. Certain states of mental or moral defect, perversion, or disorder—

the religious sense either cannot be said to exist, or it occurs only in a primitive, germinal condition. It is *innate*

[1] Article 'Buddhism' in 'Chambers's Encyclopædia.'

neither in civilised nor savage peoples. Moreover, it has to be noted that, where it does exist, a low development of religious feeling is associated with a low development of *general intelligence*. The converse holds good—that the religious, like the moral, sense is a concomitant of, and is proportionate to, considerable native general intelligence and high mental or moral culture.

CHAPTER VI.

RELIGIOUS FEELING IN OTHER ANIMALS.

In order to a determination of the question whether it can be said in any proper sense that the lower animals possess *religious feeling*, it is desirable that we should start with some intelligible *definition* of *what religion is in man.* Remembering that the *Christian* religion is a very limited one compared, for instance, with Buddhism; that the religions of different peoples are obviously very different in their nature; and that in certain races, where it exists at all, religion is developed in very rudimentary forms—the standard definition which we should adopt, if one be attainable, is one that will apply to what has been so variously described as religiousness or the religious instinct, sentiment, faculty, emotion or impulse, sense or feeling, notions or ideas, in *all* ranks of man, in all ages, in all stages of development or civilisation, and in all conditions of health and disease. We must, therefore, at once obviously eliminate all that relates distinctively to the Bible and the God of the Bible—in other words, all the peculiar beliefs of the Christian, the definitions that would exclude all religions but his own, and all the substitutes for religion where no true religion exists. Several classes of *definitions* may with propriety be made use of—viz. (1) *dictionary* definitions, which represent or reflect current popular conceptions; (2) the definitions laid down by those *anthropologists*, or other authorities, who have taken a wide survey, and made a philosophical study, of the religions of the world, and especially of the germs or dawn of religion among the lower races of man; or (3) those of modern *theologians*, many of whom are beginning to see that

there are other religions in the world than the Christian one, and that the definitions which apply to the latter do not necessarily apply to the others. Many of the most advanced of our clergy are showing signs of a recognition of the existence of material at least for the construction of a science of *comparative theology*; but I have met with none that have any conception of the broader, more important field of *comparative religion*. The following include specimens of the various classes of *definitions*. The popular, the scientific, and the theological ideas of religion are said or supposed to be—

1. That which binds one back from doing something presumably wrong. This is the literal and original meaning of the word. Such a definition may very properly refer to, or include, or be synonymous with, such faculties or qualities as *conscience*, *self-control*, or self-restraint.

2. The feeling of *reverence* and love towards a *superior being*, and consequent obedience to him.

3. *Piety*, which again is defined partly as—

   a. The sense of *duty*.

   b. Dutiful conduct.

   c. Reverence for superior beings, parents, friends, or country.

4. Systems of *faith* and worship, including the performance of worship, rites, or ceremonies.

5. Recognition and *worship* of superior embodied *power*.

6. An appreciation of the existence of superior beings (Houzeau).

7. The *fear* of more powerful beings or of superior power (Lubbock).

8. 'A blind *sense of dependence*' (Schleiermacher).

9. 'In the mingled fear and affection displayed towards the dead we witness the real *germ of religious sentiment* and the origin of theology,' is said to be the opinion of Herbert Spencer.

10. 'Always and everywhere a consciousness of relationship to a worshipped being' (Flint).

11. *Self-renunciation* 'constitutes the essence of all true religion' (Donaldson).

Such, according to various authorities, are the *elements of*

religion in lower or savage man, those elements that are common to, or form the basis of, the religions of all men.

In his Baird Lecture on the 'Philosophy of Religion,' given in St. George's Church, Edinburgh, in February 1877, Professor Flint thus defines human religion:—'The controversy as to whether religion is essentially knowing, feeling, or willing is merely verbal. . . . Religion belongs exclusively to no one disposition or faculty of the soul, but embraces the whole mind, the whole man. At its lowest it has something alike of intellect, affection, and practical obedience in it; and at its best it should include all the highest exercises of reason, all the purest and deepest emotions and affections, and the noblest kind of conduct. . . . Only a religion which presents an object of worship capable of eliciting the entire devotion of the worshipper's nature, and at the same time of ennobling, enlarging, and satisfying that nature, fully realises the idea of religion, or, in other words, can claim to be a perfect religion.'[1] This recent and public utterance of the Professor of Divinity in the University of Edinburgh is important not only as showing the breadth and liberality of view that characterise such Scottish theologians as Principal Tulloch and Professor Knight, of St. Andrews, Principal Caird, of Glasgow, and Professor Smith, of Aberdeen, but as bringing out the fact that religion is not a special or separate faculty or instinct even in man. It is, in short, merely a mode in which the action or operation of various moral or intellectual faculties, or both, may be combined, harmonised, and manifested.

Applying such a standard as Professor's Flint's to the dog, on the one hand, and to savage man on the other, to the worship by the one of man—a living, visible, intelligible power—and the idolatry by the other of his wooden or stone fetich or symbol, or his imaginary spirit, it cannot fail to strike those who have made themselves conversant with the habits equally of dog and savage how much more appropriate the description or definition of human religion is to the dog than to the man. Professor Flint tells us that the 'human heart cries out for a living, personal God to wor-

[1] 'Courant,' February 20, 1877.

ship.' This is precisely what the dog does and the savage does not do.

Whatever be the definition adopted of religious feeling, as it is exhibited (if at all) in lower man, we must admit that the same kind of feeling, the same moral or intellectual qualities, or blending of the two, are possessed at least by certain dogs, and by them frequently in a much higher degree and in a much more real sense than by countless thousands of men, including whole races thereof.

To satisfy ourselves of this we have merely to study carefully the attitude or relation of certain dogs to their masters —to man. That 'man is the god of the dog,' his deity, idol, or hero, is a saying usually attributed to Robert Burns; but, whether or not such a saying really emanated from him and represented his opinion or belief, the phrase is the appropriate expression of an easily demonstrable fact and feature in the dog's character. And there can be little doubt that the same view—perhaps not in quite the same words—has been expressed by various authors, ancient as well as modern. Among others Lord Bacon long ago wrote, 'Take an example of a dogy, and mark what generosity and courage he will put on when he is maintained by a man, who to him is instead of a god, or *melior natura*.' Both figuratively and in very truth man is frequently—certainly not always—the god or providence of the dog. That man is sometimes at least the god of the dog is true, and in a far more real sense than that the God of the Bible is the subject of genuine adoration by many so-called Christians. It may be said with the utmost propriety that to certain dogs man's will is law, man's love is heaven, man's self is god (Cobbe).

The dog's *worship of man* in many respects compares favourably with much at least of man's worship of superior beings, real or supposed, animate, inanimate, or spiritual. It does so, for instance, in the *quality* and *duration* of the *love*, which it lavishes not alone upon the person, but upon the memory and the belongings of the being it adores.

Its affection is not only pure, sincere, earnest, hearty, thorough; it is also disinterested: for it survives neglect and cruelty of all kinds. It is simple, for the animal seems

to be possessed but of one dominant idea, and that is his master (Cobbe). Its love is so intense sometimes that any rupture of the relationship, especially if sudden, any loss by death, or even temporary absence from home, of a beloved master or mistress begets, as is shown in another chapter, a fatal grief. Its love is life-lasting and unchanging, and not unfrequently attaches itself to a grave for days, months, or even years after its mortal deity has disappeared from this mortal sphere. The story of 'Greyfriars Bobby,' the well-known terrier, whose monument may be seen opposite the gate of the Greyfriars churchyard, Edinburgh, is but the type of numerous incidents of a similar kind.

In such cases there is an obvious attachment to and respect for a *hallowed* or cherished *memory*—fidelity to the memory of the dead, to the memory of a great affection. The dog also occasionally treasures up, defends, or otherwise prizes or shows a regard for *relics* of the loved and lost (Cobbe). In doing so it is apparently actuated by devotional love. But there may also be a certain amount of superstition or a certain kind of *fetich* worship.

For the worship of *man* is not the only kind of idolatry practised by the dog. As has been pointed out by Miss Cobbe, it engages occasionally in *rites* similar to those of negro fetichism and of the dancing and howling dervish. The object of worship is selected apparently on the principle on which so many human idolaters select their idols—because of its oddness, its unfamiliarity. But, unlike the West African negro, the Samoyede, or Yakut, unlike the human practitioner of fetichism or shamanism, in the dog familiarity with its inanimate idol—the stone or post, tree or bush, which at first it feared—breeds contempt; and a better knowledge of the properties or nature of its *fetich*, and especially a knowledge of its powerlessness to do harm, a knowledge begotten of due examination and growing courage and experience, leads the thoughtful dog gradually to substitute for the dread, awe, wonder—it may be superstition—with which it originally regarded it, the deference which it addressed to it, a treatment that is apt to be signally ignominious.

The term *superstition* has more than once been used in connection with the dog. The question may here fitly be raised and discussed whether superstition, such as occurs in man, exists also in the dog or other animals. According to some definitions, at least, we must concede that it does. Thus human superstition has been variously defined as—

1. Excessive reverence or fear.
2. False worship.
3. Belief in what is absurd, without evidence.
4. Idolatry of the unknown and mysterious (Cobbe).

Such animals as the dog unquestionably possess superstition of this kind. It exhibits practically a belief in the *supernatural* or preternatural. It expresses alarm at apparitions, spectres, *ghosts*. Thus it has been described as regarding an owl as a ghost. And the same kind of ghosts that are occasionally made use of in practical joking, or for more serious ends—for the intimidation of man, and that frighten him—produce the same effect, sometimes at least, on the dog. A fertile or morbid *imagination* frequently leads the horse as well as the dog to be terrified at the first sight of perfectly harmless objects, animate or inanimate, especially when seen in a state of motion and in comparative darkness—objects, that is, which are simply for the moment new, not familiar, not understood, and which therefore, being associated with supposed danger, inspire timidity or terror, as well as possibly a sense of the *mysterious* or supernatural. *Omne ignotum* is taken not *pro magnifico* but *pro malefico*; it is invested with imaginary, mysterious, undefined, and indefinable powers of evil. Bartlett speaks of a sense of mystery or of mysterious dread in certain animal inmates of the London Zoological Gardens. In many animals, in short, under certain circumstances, awe or dread of the unseen, unknown, untried, unheard, readily gives birth not only to a feeling of mystery, but, as is pointed out in another chapter, to genuine *delusion*.

We have had occasion to see, in the last chapter, how much of human idolatry may be described as, or ascribed to, the religion of *fear*. By way of contrast it is desirable here to show how much of the dog's worship of man may be

equally appropriately designated or assigned to the religion of *love*. Shakespeare tells us that

> Love is not love
> Which alters when it alteration finds,
> Or bends with the remover to remove;

but it is human love, which looks for return, which changes with changes in its object, which is too commonly resentful and unforgiving, which is in reality too frequently a mere self-love. The love of the dog for man is, occasionally at least, something higher, more sublime and divine—a love that does not change as and because its idol changes, a love that can and does forgive all things, that submits unmurmuringly to all offences, a love that 'loves on, forgetting and denying self that it may still serve' the beloved—a kind of love, in short, not usually ascribed to or possessed by *man*. No doubt such a love may be described as irrational, unreasoning, non-discriminating, in so far as it is bestowed quite as much on the undeserving as on the deserving, on objects sometimes utterly unworthy of it; and from man's point of view it is so regarded. The dog would appear occasionally to cling all the more closely to the being who spurns it, to lavish the wealth of its affection on the master who bestows upon it nothing but cruelty.

The love of the dog to its master has frequently been described as transcending the love of man either for his fellow-man or towards God. It is quite the case that the love of certain dogs towards certain masters, in its depth and purity, its sincerity and disinterestedness, is infinitely superior to the love of countless thousands of men either towards their fellow-men or their Maker. Shortly before he died Sir Edwin Landseer, embracing his favourite terrier Tiney, exclaimed, 'Nobody can love me half as much as thou dost;' and many an author such as Byron and Scott, many a man and woman who has experienced the difference between human and canine affection, has cordially echoed Sir Edwin's sentiment or opinion. Cowper makes the poet say—

> The noblest minds their virtue prove
> By *pity, sympathy, and love:*
> These, these are feelings truly fine,
> And prove their owner half divine.

If this be the case the dog, by the possession and exhibition of such 'noblest feelings,' must be considered as a very embodiment of the religion of love and charity. Cowper also compares—favourably for the dog—the watchful love of his dog Beau with his own feelings towards God:—

> But chief myself I will enjoin,
> Awake at duty's call,
> To show a *love* as prompt as thine
> To Him who gives me all.

A striking feature in the dog's love for and worship of man is, as we have seen, its utter forgetfulness of *self*, its self-renunciation amounting frequently to self-sacrifice. The dog is often ready at any moment to give up its very life not only to save the life of its master or its master's child, but simply in order to obey some of his trivial behests, such as the guarding of property. The animal not only works and fights but dies for man, and not always, or even generally, for a master or friend who has been kind to it, who has earned its devotion, but frequently, if not generally, for some master or man most unworthy of such heroic self-sacrifice. Now this sort of *self-sacrifice* has been described as the highest achievement of human virtue, as the very essence not of morals only, but of religion—the giving up, that is, not only of one's own interests and pleasures, but of one's own *life* for the good, real or supposed, of others.

Another of the *moral virtues* involved in the dog's love and worship of man is its practice of *returning good for evil*, of repaying evil with good, of giving faithful service for cruel neglect. Such a practice includes much more than the mere *forgiveness* of enemies or injuries, for to the passive virtue of forgiveness is added the active one of *benevolence*. The dog or lamb licking the hand of the slayer in the very act of slaying is the most affecting of all incidents, admits even sarcastic Pope; and it is certainly one of the most familiar, one that has repeatedly been celebrated in verse and story. Hood exclaims, and may well do so—

> Alas for the rarity
> Of Christian *charity*
> Under the sun!

But charity, and of the highest kind, is by no means uncommon in the dog; nor is the object of its charity always or necessarily man.

That in certain cases at least the dog recognises man's *higher nature*, his supremacy or superiority, not only of a mere physical but also of a psychical kind, there can be no doubt; for we know that it appreciates in man *moral goodness* and intellectual ability, of certain kinds at least, and in their embodied form. Though, therefore, it sometimes places an unbounded, unquestioning, impregnable, implicit, unhesitating confidence or trust in a master or man who does not deserve it, or while it may look upon man frequently as its mere *providence*—its provider with food, shelter, or protection—or as its ruler, regulator, governor, or lawgiver —there are certainly cases in which it attaches itself to man in consequence of his amiable qualities, just as it detaches itself from his influence or power where intellectual stupidity on his part exists. In other chapters it is shown how excellent a judge of *human character* the dog is. Even as a providence—as the higher being who gives him his 'daily bread,' who cures him in disease and relieves him if disabled, who is the source 'from whom all blessings flow'—all the blessings, that is, of domesticity—the dog must recognise in man *moral virtues* and intellectual ability—technical knowledge and the power of applying it—as well as mere bodily strength.

The moral goodness of man, moreover, may be communicated to his dog. The tendency of intimate association or companionship, even without special education, is to assimilate the character of the dependent to that of its master, to make the dog a *reflex* of the man, as is shown in the chapters on 'Education.' So that it may be said, in one sense at least, that the dog is, or may be, *made in the image* of the being it worships. The character of the man determines very much that of his dog, whether for good or evil—a significant fact in relation to man's responsibility for his treatment of lower animals.

In connection with the dog's worship of man it has also to be noted that it possesses the power of *prayer*, petition,

entreaty, appeal, in many different forms, all of them more or less eloquent. The true spirit of prayer—of the supplicant for mercy or pardon, of the petitioner for reconciliation and restitution to favour—is frequently contained in or conveyed by the mere look or attitude of the dog. The earnestness or sincerity of its prayer is equalled only by its eloquence, while the same thing certainly cannot be said of the bulk of man's ceremonial petitions, religious or other. The power of appeal or request, however, belongs more naturally and properly to the chapters on 'Language' or the expression of the desires. If *qui laborat orat* or *laborare est orare* is true of man, it must be no less so in the case of other animals, whose labour so frequently transcends that of man in its disinterestedness and other good qualities. Our own Montgomery, sometimes called distinctively the Christian poet, in his well-known verses entitled 'What is Prayer?' tells us, as beautifully as truly, that it is

> . . . . The soul's sincere desire,
> Uttered or unexpressed:
> . . . . The burden of a sigh,
> The falling of a tear,
> The upward glancing of an eye. . . .

All this is as strictly applicable to the dog as to man, though its prayer, while not 'uttered,' may nevertheless be even more eloquently 'expressed' than by mere vocal or verbal utterance. The dog's appeal to man is determined obviously by a sense of the vainness of its own efforts—of its own powerlessness, and of the *need of the help* of a *higher being*—a subject that is discussed more fully, however, in the chapter on 'Self-submission to Medical and Surgical Treatment by Man.'

A parallel or equivalent to man's kneeling and bending in prayer, to the various forms or degrees of his prostration or grovelling before his idol or fetich, is to be found in the dog's crawling to its master's feet—an eloquent expression of its abjectness, of its submission to the stronger will, the superior being, the offended governor. Dr. John Brown describes the *solicitation of pardon* in and by his terrier Nipper by crouching, grovelling, utter self-abasement. Again, a

certain bitch, that had a special respect for the drivers or stokers of locomotive engines on the Metropolitan Railway (London), and on no other, when she found one of these her human idols, 'grovelled before him, danced around and fawned on him, doing *fetich* generally to him.'

Nor are there wanting minds and men—devoutly theological on the one hand and highly poetical on the other—students of nature and in sympathy with all nature's works, that look upon bird song as a form of *praise* to our common Creator. Thus the late Canon Kingsley tells us that St. Francis 'saw no degradation to the dignity of human nature in claiming kindred lovingly with creatures so beautiful [as birds], so wonderful, who [as he fancied in his old-fashioned way] praised God in the forest even as the angels did in heaven.'[1] Such a conception will be regarded by others than Kingsley as only a fancy. But it is not only a beautiful fancy: there is a possibility at least that it may represent more than fancy—fact. It may be a mere expression of the joyous sense of existence, unconscious, non-voluntary in strictness; but even so considered it may be regarded as a form or species of praise.

In the dog there exists not only a necessity for loving or bestowing its superabundant love on some object, worthy or unworthy, but there is the same craving for affection or attention, the same *necessity for love* or of being loved, that is so characteristic of the human child. This longing for the affection of its master prompts the dog to seek, by all the means in its power, *reconciliation* when it has given him cause of offence, and feels that it is in his disfavour. Such a craving leads to efforts—frequently repeated and of all kinds—at propitiation; the animal tries to deprecate its master's wrath, to ingratiate itself once more in or into his good graces, to obtain restitution to favour—in other words, to ensure *forgiveness*. Its sense of *sin* or guilt is here at least associated with a perception or feeling of the necessity for or desirability of pardon.

In some cases the sinning animal seeks to make *atonement* for its sin, as is pointed out in other chapters—for instance,

[1] 'Prose Idylls,' 2nd edit., 1874, pp. 24–5.

those on 'Crime' and 'Punishment.' And among the means whereby it endeavours to atone or propitiate is the making of *offerings* to the person offended or supposed to be offended. To us these peace offerings may appear at first sight to be of a very trivial or absurd kind, as when a cat offers a captured mouse or rat, dead or living, to its master. But, in judging of the action and its motive, we must bear in mind that in such a case the article offered is that which is of the *highest value* in the eyes of the offerer; and as much as this cannot certainly be said of the propitiatory offerings, religious or otherwise, of man.

When the dog has succeeded in reinstating itself in favour, when its offering has been received in the spirit in which it was made—when, in short, it is successful in its efforts at re-establishing amicable relations with the being whose slightest love it so highly values—the animal's delight is unequivocally expressed; while, under opposite circumstances, there is corresponding depression, despondency, or despair, all the shades of grief or sorrow, leading even to fatal pining for the affection that is refused or withheld.

Dogs not only worship man, but they *attend worship with him*—take part so far in his religious observances. In doing so the following points are to be specially noted:—

1. The appropriateness of their behaviour to the place and time, varying in the case of the dogs of Protestant and Catholic masters attending Protestant or Catholic churches or chapels; and—

2. The correct perception of time and locality—a subject, however, that falls more appropriately to be treated of in another chapter.

Church attendance by dogs is, and has long been, a common phenomenon in the pastoral districts of Scotland. Scotch shepherds, both in Highlands and Lowlands, are a devout, church-attending race; and, so far at least as concerns regularity of attendance upon the ordinances of worship, and demure, decorous behaviour thereat, their dogs, or 'collies,' are equally devout. These Scotch collies frequently have particular seats or pews—or at least their equivalents, lairs or couching-places—in church; and there,

when no attempt is made by them—as it sometimes is—at psalm-singing, the animals rest quietly and sedately until the completion of the service. It may be, and probably is, the case that they frequently coil themselves comfortably and compose themselves to sleep as soon as the service has begun; but that a similar process is quite as common and much more conspicuous and inexcusable in man, I have no room for doubting, inasmuch as I have over and over again myself seen in country—aye, and in city—churches in Scotland people—mostly males, be it in fairness explained—deliberately composing themselves for a good, sound sleep before the service begins—a sleep so natural in one sense as to be not unfrequently accompanied by snoring and to require vigorous nudging or shaking to rouse from it.

We may be—and no doubt will be—told that the shepherd's dog acquires the habit of attending church, and of behaving becomingly therein, by mere *imitation* of its master. And there can be no denying the important influence of imitation in the acquisition of artificial habits by the dog and other animals. But many incidents, or classes of incidents, show that, in this case of church attendance at least, the influence of man and of mere imitation is apt to be overrated—is, in fact, really much less than at first sight it appears to be—for church-going dogs do not by any means always or necessarily attend church with their masters. They go sometimes in spite of, and without, their master, feeling that they are incurring his displeasure and a certain punishment in doing so. Knowing, by means which we must not stop here to consider, Sunday from other days of the week, and the proper hours of public worship on Sunday; quite familiar with the road to church and with the topography of the church itself; quite aware, further, that it is their master's wish or intention to prevent their going to church on Sundays—many astute dogs, determined, for their own reasons, to have their own way, have disappeared on Saturdays, have secreted themselves in order to escape imprisonment in a kennel or elsewhere, and have made or found their way to and from church quite alone. Southey tells the story of a Methodist's dog 'who regularly went to

chapel, though pelted by the church boys for so doing. His master . . . . never went; and the interpretation put upon the dog's conduct was that he wished to attract his master' to church attendance. It is at least a coincidence that when his master met with an accidental death by drowning, the animal ceased to attend chapel. Dr. Macaulay too speaks of many church-going collies as 'more regular attendants than their masters.'

It is obvious that, in many cases at least, such dogs value church attendance as a *privilege*, for which they are prepared to make, and do make, great *sacrifices*. Not only do they travel long distances afoot in all weathers, but they deprive themselves of shelter and food, and expose themselves to their masters' wrath, and to the certainty rather than the risk of ignominious punishments. Whatever, then, be the dog's motive in attending church under such circumstances, it would appear to be at least a strong one. It may be a love of society, either of its own kind or of man; for in wild pastoral regions, where population is sparse, the Sunday congregations of farmers, shepherds, peasants, and their dogs constitute one of the very rare and favourable opportunities of meeting with their kind. It may be an allied dread of monotony, a longing for relaxation of a certain kind, a love of novelty and variety. If such motives operate—as is quite likely—it cannot truthfully be averred that they do not also operate largely—sometimes, it may be, exclusively—in the church-going of man himself.

We know, as Hood says, that

> A daw's not reckoned a *religious* bird
> Because it keeps a-cawing from a steeple.

Nor is a shepherd's collie to be considered religious simply because it regularly attends church, even at great personal sacrifice, risk, or inconvenience sometimes. So long ago as 1791 Salmagundi thus remarked of 'a favourite dog, who regularly accompanied his mistress to church':—

> 'Tis held by folks of deep research
> He's a good dog who goes to church:
> As good I hold him every whit
> Who stays at home and turns the spit;
> For though good dogs to church may go,
> Yet going there don't make them so.

And the same may be quite as truly said of their masters; they may be good, pious men, but it is not the going to church that constitutes either goodness or piety. In so far, however, as mere church attendance, the observance of rites or ceremonies, seriousness of look or demeanour, are to be accepted as outward marks of religion or religiousness in man, there is no good reason, but the reverse, why they should not equally be accepted as evidences of religion in the dog; for, as has already been seen, the lower animal makes sacrifices of a kind that is at least uncommon in man in order to obtain the much-coveted privilege.

Scotch shepherds' collies are not, however, the only dogs that have been popularly, and with a certain degree of propriety, denominated 'religious.' In France, a Catholic country, dogs attend prayers or mass with their masters, exhibiting in the grand cathedrals of that beautiful land a becoming behaviour, including gravity of look and demeanour, silence and motionlessness, an attitude of apparent attention or intentness, and a probable feeling of awe, produced, it may be, by the 'dim religious light' of such edifices, or by the varied, impressive sights and sounds that environ them—a kind of conduct, in short, only too instructive or suggestive to irreverent *man* (Pierquin and Watson). It would appear further that in Catholic countries imitation of man leads church-going dogs to the stage of *fasting* (Southey). So that *Catholic* and *Protestant* dogs may be spoken of with somewhat of propriety—the one group fasting and attending mass and all church festivals, like Catholics; the other going to the kirk and sometimes at least attempting psalm-singing, like Protestants or Presbyterians.

Nor are dogs the only animals that may claim occasionally to be considered 'pious.' While collies regularly attend church they cannot be said, as a rule, to take any active or intelligent part in the service; but in the case of the *parrot*, which is not usually allowed to attend church, the bird not unfrequently takes a prominent and certainly intelligent part in the private worship of its master's household. Such parrots, for instance, make *responses* at the

proper time—an exercise that implies a good deal more than mere memory, mere attention to the service. They have been taught, moreover, or they have learned, to repeat man's *creeds*, to recite *prayers*, and even, or otherwise in a certain sense, to act as domestic *chaplains*—as substitutes, in other words, for man himself. As in so many other cases, the behaviour—nay, the very *speech*—the remarks or conversation of the bird, are suitable to place, time, and other circumstances. Thus a certain English bishop's parrot is (or was) in the habit of saying—sometimes quite devoutly and with becoming solemnity, at other times sarcastically or ironically, but in either case at proper seasons and appropriately to the circumstances—'Let us pray.' Of another we are told that it 'could sing in correct time and measure—

'There is a happy land.'

EDUCATION AND ITS RESULTS.

CHAPTER VII.

CAPACITY FOR EDUCATION.

It must be utterly fatal to the supposition, hitherto so popular, that *instinct* is immutable, being already perfect, if it can be shown, as it very readily can be, that the moral and intellectual faculties of the lower animals are capable of *improvement* to a high degree, that there are ample evidences among them of very marked *progress* in skill, ingenuity, adaptiveness, caution, and other mental qualities or aptitudes. This mental improvement or progress includes even the acquisition of *new* faculties, the development of those which are *latent*, with the perfecting of others.

What has been spoken of as mental *potentiality*, the capability of progressive improvement, has long been regarded as one of the many features that distinguish man from other animals. It is just as absurdly assumed, however, that in man there is a possible perfectibility of his moral or intellectual nature as that in other animals there is no moral or intellectual nature to be cultivated or developed. The truth is that in both cases there are moral and intellectual powers, capable of cultivation; that in both perfection is practically unattainable—certainly has never been attained; that in both, and especially as regards the lower animals, the limit already attained is not that which is attainable. It cannot

be said that man has improved his mental faculties beyond a certain point; his greatest admirer can scarcely claim for him perfection either moral or intellectual; and evidences are constantly being brought before us of the decided limitation of intellectual or moral improvement in various savage races. With them the experiment has been tried over and over again of 'civilising' them, and has failed. On the other hand, it may be most truthfully asserted that the lower animals have not yet had the benefit of the persistent, patient, kindly efforts of man to develope their moral or intellectual nature. The degree of mental cultivation which is possible in their case has not yet been properly tested or realised; their mental *potentialities* are therefore as yet almost unknown. We have yet to determine in them what are the *new* powers they are capable of acquiring; what *latent* faculties may be developed; what is the nature of certain aptitudes that they appear to possess, but of whose character and *modus operandi* we are at present ignorant; and what is the probable limitation of their progressibility or improvability. These form most interesting problems in the comparative psychology of the future.

Concerning the *non-improvability*, the non-progressiveness, of *savage man*, his incapacity for education or civilisation, recent testimony concerning the African negro has been laid before the world by Livingstone, Monteiro, Burton, Baker, and other travellers. Livingstone tells us that 'a gentleman of superior abilities has devoted life and fortune to elevate the Johanna men, but fears that they are an unimprovable race.' Monteiro 'has but a poor opinion of the capacity of the African, and but little hope for his future. He believes that all the efforts hitherto made to elevate and civilise him have failed, and his conclusions on the subject coincide essentially with those of Burton and with those of most other authorities who have examined it dispassionately ('Nature'). Monteiro himself says, 'I can see no hope of the negro ever attaining to any considerable degree of civilisation, owing to his incapacity for spontaneously developing to a higher or more perfect condition. . . . The negro must ever remain as he has always been, and as he is at the present day.'

But *incapacity for education* or improvement is not confined to the African negro, nor to savage races of man; it occurs also amidst our highest civilisation—for instance, in the idiot, or at least in certain kinds or classes of idiots, at certain stages or in certain states of idiocy (Browne, Ireland, De Vitré). It occurs also in many other forms of mental defect or derangement, in many criminals, perhaps in whole classes of our criminals, and in certain wild children.

Incapacity for civilisation would also appear to be a characteristic of certain classes among ourselves who belong to none of the categories just above enumerated. There are in various parts of our own country, even in the hearts of our great cities, whole ranks or classes of the community who may fitly be denominated *white savages*, the savages of our boasted civilisation. Of a specimen or type of these savages, dwelling in our midst, within hearing or easy reach of countless churches and other agencies of Christianisation and civilisation—certain cave inhabitants of Caithness, Scotland —Dr. Mitchell, of Edinburgh, reports as follows:—'The low and sedimentary [intelligence and morals] were not due to the want of cultivation so much as to the inability to receive culture. Indeed, speaking of this class as a whole, it might be said they were not so much uncivilised as *uncivilisable*.'[1] And as to this Dr. Mitchell is a competent judge, for as one of H.M. Commissioners in Lunacy for Scotland he is familiar with all the phases of human idiocy, and with the extent to which certain idiots even may be educated or civilised.

Incapability of improvement by education is seen also in certain animals with defective or disordered mental faculties. The subject is treated of in the chapters on '*Stupidity*,' '*Error*,' and '*Mental Derangement*.'

In other cases the capacity for learning, for profiting by tuition of whatever kind, is curiously *limited*, many animals, like many men, being able to learn only certain things or kinds of things. There are apparently *special* kinds or directions of intelligence, that require a correspondingly special education for their due development. In certain dogs and in

[1] 'Daily Review' report of a lecture delivered in Edinburgh in February 1877.

certain other animals there are special natural *talents* which must be discovered in order to be cultivated by man, and which are frequently discovered and successfully cultivated, to their gain, by the enterprising trainers of 'performing' or 'learned' animals. Hence an animal's education is sometimes specially theatrical or arithmetical, musical or gymnastic, while every such specialisation of instruction implies a certain basis of *general* education. Thus the sporting dog has what may be termed its *technical* or *professional* education; its discipline is directed and adapted to the nature of the special sport, occupation, or employment in which it is to be engaged (Walsh).

But, as a general rule, there is wonderful capacity for mental progress under training among the lower animals—singular moral and intellectual plasticity, ready response to all efforts or circumstances that lead to evolution of their varied faculties, whether of mind or body. There is a speedy or gradual acquisition of knowledge, usually of a practical kind, and a due application of that knowledge to circumstances. Further, the modes of acquiring their knowledge, of whatever kind, are the same as in man. In the first place, a high degree of general intelligence is necessarily involved, while the following special faculties are called into play:—

Observation.	Comparison.
Investigation.	Judgment.
Experiment.	Imagination.
Attention.	Volition.
Imitation.	Emotion.
Memory.	Patience.
Perception of error.	Perseverance.
Self-correction.	Zeal.
The practising of lessons.	Diligence.
Reflection.	

The education of the lower animals is divisible, as in the case of the child, into that which is—

1. *Physical* or bodily, tending to the development of muscular activity as well as to general healthiness of body, and necessarily also of mind.

2. *Intellectual*, tending to the development of mental cleverness, of sagacity, ingenuity, adaptiveness.

3. *Moral*, tending to goodness of disposition, to the evolution of such virtues as self-control, self-sacrifice, integrity.

It is in regard to the last of these three forms of education that the chances of future progress and success are greatest. It is in this direction that least has been done by man, if anything can be said to have been done at all. Much has been done, much is being constantly done, by foolish man, ignorant of his own best interests, to deteriorate the moral character of subject animals by his own evil example or by his injudicious treatment. But he does nothing systematically to improve it. While he spends infinite pains on the production and improvement of breeds of dogs or pigeons, specially keen of sight or scent, or specially dowered with speed, he gives himself no concern about his companions or pets being *morally good*. And yet it is quite as easy to produce moral goodness as physical agility or intellectual ability. Not only so, but man has it in his power, by applying the proper correctives to the moral vices he has himself created in other animals, to substitute moral goodness for moral badness, moral virtue for moral vice. He may reform and restore to the paths of rectitude animals that are morally in the position of the 'gutter children' that become the inmates of our reformatories of all kinds. Thus dogs that have been taught by him to steal may be *cured* of the bad habit by care, and honesty substituted (Watson).

The most promising of all animals on whom to try the effects of *moral education* are the anthropoid apes, such as the orang and chimpanzee. We know how humanlike has been their behaviour when they have been civilised by man, made his servants or companions on board ship or in his household. We know how in them politeness or refinement of manners may be developed, and all the usages of good society; how they can behave at table and take their meals; how they can act as substitutes for the negro in various kinds of domestic or other service. But we do not yet know how good they can be made, to what extent or in what directions their moral nature may be developed. I believe

that, could only they be induced to bestow them, the patient efforts of our missionaries in this direction—on our anthropoid 'poor relations' instead of on their fellow-creatures and countrymen the negro—might produce results of a startling character—results that might put an end, once and for all, to current sneers as to the psychical connection between men and monkeys.

At present aptitude to receive instruction, readiness to repay tuition, capacity for education—whether moral, intellectual, or physical—is supposed to be greatest in the dog. But this is probably simply because man's efforts have been chiefly expended upon him; that he comes most constantly and intimately in contact with man, and that he is therefore best known to man. Remarkable facility in learning man's lessons is known to exist also in the parrot and bullfinch, and in certain other song birds. But we cannot at present be said to possess a satisfactory knowledge of the relative capacity of different animal genera and species for education. Of the differing capacity of *individuals* of the same species we know much more—know, in fact, a good deal—know that it occurs to the same extent as in man—a circumstance that is familiar to all trainers of horses, dogs, or other animals. This branch of the subject is again and more fully referred to in the chapter on '*Individuality*.'

The proper education of the lower animals requires—

1. Certain qualifications in the teacher.
2. Certain aptitudes in the pupil.
3. Certain other favourable circumstances in external or surrounding conditions.

The trainer, in the first place, must make all due allowance for *individuality*, for the natural mental aptitudes of his pupils, for their natural courage, sagacity, and other qualities of character; and, in proportion as he makes a preliminary and special study of this individuality, is he likely to be successful in his results.

The necessity of attending to individuality, of studying individual character or disposition, becomes apparent in—

1. Zoological gardens and menageries.
2. Lion-taming and similar public exhibitions.

3. The instruction of all classes of performing animals.
4. Horse and dog training.

In the training of animals destined for any of the 'learned professions'—the professions that subserve the purposes of human exhibitors—the first procedure (and a most important preliminary it is) is to *test* the mental capacity, the disposition or character, of various individuals of a species, selecting those which promise to learn quickly and become submissive readily.

Both in the human child and in other animals man's first efforts at education are necessarily *experimental* or tentative, his object, and the result, being to distinguish those individuals who can from those who cannot be educated, those who will repay his continued efforts from those on whom they would be wasted. Thus, in selecting horses for circus purposes, Franconi, Astley, Ducrow, Cooke, and other circus proprietors have found, to their cost, that out of many trials only a few animals are sufficiently intelligent for their purposes. And the same has also been the case with the trainers of other 'performing' animals.

The teacher must even be guided by the *mood* or humour of his animal pupils for the moment. Song birds are frequently 'not in song'—not in a humour for it, just as the talking parrot is often least disposed to exhibit his gift when it is most desirable or desired that he should exhibit it.

In the next place man's training cannot begin too *early*: his pupils cannot be too young. 'Learn young, learn fair' is as applicable to other animals as to man. Another even more apposite proverb reminds us that we cannot 'teach an old dog new tricks.' Education, to be thoroughly successful—to give pupil and teacher equally fair play, to enable the latter to develope the best features of character in the former—must begin in youth, during the impressionable stage of existence, before counteracting habits have been acquired or antagonistic experience gained. Thus the simple secret of taming and training wild animals as companions to children is to catch them very young—in their infantile stage—and to bring them up along with the children by the same process of education—a combination of kindness with firmness.

Next, training must be by *stages*—gradual, progressive, *pari passu* with the aptitude of the pupil, his acquisition of knowledge and the power of applying it.

The trouble that is necessary at one stage may not be so at another. Laborious instruction in every detail may be required at first, then careful and constant supervision, while at last the desire to learn and the aptitude for learning may become such that the intelligent animal works by itself.

Then education cannot be too *systematic* and thorough. So systematic is it in some cases—for instance, in the training of piping bullfinches in some parts of Germany and the Tyrol—that there are regular *schools*, seminaries, or academies, with regular *classes* of scholars, according to their stages of progress, presided over by *head masters*, assisted by *tutors*, the pupils being scolded or rewarded according to their deserts—the nature of their performances. In Belgium, again, there are schools for the training of home-flying pigeons; while regular training stations have been established by Germany for homing pigeons at Metz, Strasburg, Coblentz, Mayence, Berlin, and elsewhere. In our own country certain stables and kennels may be considered academies for the regular training of race-horses and sporting dogs.

There is, then, a regular course, series, or *system of lessons* in the 'breaking in' of horses and dogs, and in the training of carrier pigeons, and of the race-horse or of the working elephant.

The *teacher* himself should possess personal qualities of a kind that render him specially suited for the work he has undertaken. These qualities include—

1. *Good temper*, involving forbearance, patience, gentleness, kindliness.

2. *Sympathy* for and with his pupils.

3. *A knowledge of the capacities of his pupils*, on the one hand, and of the *principles of education* on the other.

4. *Tact*—in the ready power of adaptation to the moods and character of his pupils, to time and place, and other circumstances—in the power of gaining confidence, esteem, affection.

5. The necessary kind and degree of *firmness*.

6. *Perseverance*, like patience, may have to be infinite.

7. *Persuasiveness*—the use of encouragement or coaxing.

These must form the *basis* of the best systems of education, whether of other animals or of the human child. Berkeley advocates in the training of sporting dogs a combination of kindness, firmness, and persuasion.

On the part of the *pupils* there must be a basis of receptivity, aptitude, or capacity, the power of *application*, involving sufficient force of *will*; and there should also be willingness to learn, and effort in learning. It is the combination of these good qualities that leads so many intelligent animals—the elephant, dog, parrot—to *practise their lessons*, to make effort, and persistent effort, at *self-improvement*.

Among the conditions favourable to systematic education by man are *time*, the absence of *distraction*, and the incessant *repetition* of his lessons. There is an obvious necessity for *time* in the acquisition of knowledge or skill. Results cannot be achieved at once; they may be rapid in their growth in some cases, but more commonly they are gradual, even slow, so that it is not till an animal has arrived at maturity, or even old age, that it has duly learned, and learned to profit by, the lessons either of man or of experience. Many animals have to serve an *apprenticeship* in the detection of danger, and the means of avoiding or escaping it in constructive and defensive operations.

Time is obviously requisite for the learning of lessons, in successive series, as requisite as in the case of the human child. Much depends, as regards the *duration* of training, on the character of the teacher, on the one hand, and of the pupil on the other, as well as on the nature of the accomplishment to be acquired—the lessons to be learned. Thus while it may reasonably be expected that all animals of average capacity will more or less speedily learn to fly or run, to catch prey, to kill and eat it, to select and collect food, it must take a much longer period to teach man's words or songs, to enable them to find their way home from great distances, to act in concert, to play parts, to subdue or control their natural strong passions or propensities.

The work of tuition and of learning implies *time and trouble* on the parts both of pupil and teacher. There must

be no mental *distraction* on the pupil's part; he must give his attention wholly to his lessons for the moment. In particular there must be no disturbing sensorial impressions, especially of vision or hearing; all sights and sounds, save those with which it is desired to impress the pupil, must for the time be rigidly excluded. And this is so well known to trainers, for instance, of song birds, that they resort sometimes to cruel methods of securing the end desired. Hence the practice of artificially blinding song birds. Hence the fact that in confinement song birds learn singing better than they do at liberty. There are, therefore, favourable and unfavourable times and places, circumstances or conditions, for successful instruction.

The *use and disuse* of faculties, as of organs, produce the same results as in man, of increased or diminished power. Hence the advantage and importance of continual *exercise* of certain acquired aptitudes or faculties, an importance or necessity recognised sometimes by the animals themselves in their aiming at perfection or excellence—for instance, in song. Sporting dogs forget their special accomplishments from want of practice (Walsh).

Discrimination must be shown in adapting the *form* of training or teaching to the nature of the animal to be taught. It is obvious that a perfectly wild animal requires more care and trouble than the offspring of a domesticated one, which has the advantage of certain inherited aptitudes. And the same comparative difficulty exists in the case of mature or elderly animals and those that are naturally stupid or unintelligent.

The influence of *example* and of imitation is illustrated in all forms of upbringing of the lower animals, as of man himself. Of him it was long ago truly said—

Exemplo plusquam ratione vivimus.

Hence the importance of placing before the young animal a proper model, and hence also the importance of man's own behaviour before it being guarded and becoming.

It is always important that there should be a *mutual understanding* between teacher and pupil, who frequently become

master and servant. This is so obviously an advantage in the case of the sportsman and his dogs that it is desirable their lessons should be learned together (Walsh); there should be a conjoint education, so that the servant may as thoroughly understand the capabilities of his master as the latter those of his servant. Hence the advantage of the training by their owners themselves of sporting dogs. There are some excellent well-bred sporting dogs, as there are horses, that only work properly under or with a master, whom they can respect, in whom they have confidence—confidence not in his kindness, but in his skill as a sportsman or rider. Nor must it be lost sight of that there is frequent *congeniality of pursuit*; the horse or dog may become as fond of the race or chase as the huntsman; and wherever this common love or interest in the work exists, the work itself, whatever it be, is likely to be thoroughly well done, equally by man, horse, and dog. Mutual confidence and affection beget improvement of the *moral* character, as well as of certain mental aptitudes, of both master and animal companion or servant, a circumstance frequently observed in the relation of man to his horse or dog.

The *lessons* of life learned by the lower animals may be either—

1. Those taught by experience, including need or necessity, frequently dearly bought.

2. Those taught by their parents, elders, seniors, or companions, and insisted upon by penalties.

3. Those taught by man, inculcated sometimes systematically in regular schools.

4. Those self-imposed, in the form of lesson practising or learning.

Obviously, then, such lessons may be either deliberately taught and consciously acquired, or they may be learned *unconsciously*, as in the case frequently of the influence of example and imitation. There is an education of this kind—one not contemplated by either teacher or pupil, both of whom are unconscious agents in the result—in the acquisition by *foster young* of the habits of foster parents. Thus the dog acquires sometimes catlike habits from asso-

ciation, from its earliest years, with a cat; it learns, for instance, to respect the cleanliness of the house, and is itself cleanly.

Equally in other animals as in man, education developes or determines *new* tastes, feelings, passions, ideas, aptitudes, habits.

It is important to bear in mind that the children of certain savage races of man receive *no direct instruction* from their parents or elders. Imitation, necessity, experience, practice, lead to a more or less rapid acquisition in them, as in so many other animals, at once of physical and mental dexterity.

It is well to bear in mind also that animals possess both natural and artificial *arts* or aptitudes. Thus in our pet song-birds singing is an *artificial* art, developed by man by culture, while dancing in certain birds is a natural and spontaneous effort (Houzeau). Equitation in the ape is also an artificial art, but it is usually or frequently self-acquired, not taught by man (Houzeau). So that 'artificial' is not necessarily synonymous with 'taught by man.'

CHAPTER VIII.

SELF-EDUCATION: THE ACQUISITION OF KNOWLEDGE BY INVESTIGATION.

INVESTIGATION on the part of the lower animals, usually in order to the acquisition, extension, or improvement of knowledge, includes the following features of interest in their mental character—the following aptitudes or conditions:—

1. The faculty of *observation*: its nicety, minuteness, accuracy, acuteness, delicacy, closeness or keenness, including the comparison of resemblances and differences.

2. The power of *attention*, and of concentration and continuance thereof.

3. The practice of *examination* or inspection of unfamiliar objects, including—

   a. Reconnoitring and surveying.

   b. Search and exploration.

   c. Deliberate study.

4. *Curiosity* or inquisitiveness; associated with a—

5. *Love of knowledge*, especially of such a kind as will bear on the physical requirements, comforts, or safety of the animal itself.

6. The application of *experimental tests*, with—

7. *Repetition* and variation of effort therein.

8. The power of *memory*.

9. The influence of *novelty* of scene, sight, sound, or other external conditions.

10. The drawing of *inferences* or conclusions from the results of observation and experiment.

11. Due *reflection* and reasoning on the bearings of such results; and—

12. Appropriate *action* following such reflection.

That many animals are very observant scarcely requires to be insisted upon. Close and continuous *observation* is indeed a necessity of their existence in the wild state. Its forms, results, and applications are illustrated in an infinite variety of ways, including the following:—

1. The reading of a master's mood, intentions, or character by the dog.

2. Notice of natural or artificial landmarks by the homing carrier or courier pigeon.

3. Knowledge by birds of the range of man's projectiles.

4. Recognition of—

a. Each other.

b. Persons.

c. Places.

d. Things—

including the discrimination of—

e. Friends from foes, of strangers from acquaintances or kinsmen.

f. The trappings of rank, such as livery, or the dress of masters and servants, rich and poor.

5. Appreciation of *beauty* of colour and form in design, including the details of *pattern*.

6. Selection of cards—by a knowledge of the marks they bear—by performing dogs.

7. Notice of secret *signs* or signals on the part of other performing animals—signals unobserved by an audience.

8. Detection of defect or debility, injury or accident, mental or bodily, in their offspring or in each other, also in cases unobserved by man.

9. Certain kinds of prevision or *presentiment*.

10. *Calculation* or measurement of heights or distances.

It is impossible here to illustrate at any length all of these forms in which animals manifest their power of *observation*, but it is desirable to notice shortly one or two of them. Perhaps one of the best and most instructive is to be found in the phenomena of homing, or *home-finding*, in the carrier or courier pigeon—phenomena that but lately were universally relegated to the fallacious category of 'unerring

instinct.' It has now been proved to demonstration that the flight of the Belgian or other homing pigeon is directed solely by the *observation of landmarks*. It has been found *inter alia* that—

1. Only a proportion of the animals submitted to training are successful in their flights. These successful ones are presumably the most intelligent and observant. In every pigeon match many birds fail altogether in home-finding.

2. Even the best animals can fly only by daylight, when landmarks are visible. They fail at night or in fog; they wait and watch for daylight and a clear atmosphere.

3. They lose themselves, moreover, prior to the acquisition of sufficient knowledge of the road.

4. The acquisition of this knowledge is gradual, by a series of progressive lessons, which are learned thoroughly and easily in proportion to a bird's—

a. Natural intelligence.
b. Keenness of vision.
c. Retentiveness of memory; and the—
d. Intensity of its home affections or the nature of the attractions to its native place.

Much more familiar than the homing of pigeons is the *recognition of persons* by a great variety of animals, including the dog, cat, horse, mule, elephant, cows, monkeys, orang, hare, hedgehog, rats and mice, parrots and other cage birds, crow, various fish, hornets and bees.

All these and other animals come sooner or later to know their masters or mistresses, those who are kind or cruel to them, from all other persons; and their behaviour to strangers or enemies is very different from what it is to those with whom they are familiar and friendly.

Thus Mrs. Mackellar tells us, 'I have often seen cows refuse to give a drop of milk to a stranger—refusing the milk being the revenge a cow takes if in the sulks.' And of a shipboard pet hedgehog, 'I always fed her, and she knew me very well, for she would never put up her bristles whatever I did to her.' Watson gives the case of a crow recognising and visiting a former master. Even bees know their master or keeper from strangers.

Smuggling dogs distinguish custom-house officers ('Percy Anecdotes'). Certain London railway dogs recognise their own special friends among the porters or other officers at the different stations, making, it is asserted, no mistakes. Other dogs frequently distinguish from among other men the murderer, burglar, or thief; the butcher or dog-stealer; the poor beggar or tramp, their master's inferior, and the well-conditioned visitor, their master's equal; policemen or firemen, with their calling and its object. Pet dogs occasionally discover their masters' bodies on a battle-field.

The horse and the mule distinguish the semi-nude red native Indian from the clothed, civilised white man on the North American prairies, showing fear or suspicion in the one case, confidence or unconcern in the other. The horse distinguishes its own master and rider from its master's domestics and from crowds of other persons who are strangers to it. Elephants recognise friendly soldiers on the field of battle (Pierquin). The orang discriminates between native boys and monkeys, and shows its pride by refusing to associate with the latter (Cassell).

It is somewhat singular that many animals, which readily recognise persons, do not notice and remember with equal readiness places, or *vice versâ*. Thus the parrot shows a decided power of recognising persons, and pigeons locality, but not *vice versâ* (Darwin).

Many animals, again, recognise each other as fully and easily as certain dogs know their masters or mistresses. And this kind of recognition of comrades or kinsmen extends downwards in the zoological scale at least as low as insects. Ants and bees, while caressing their acquaintances, deal summarily with strangers, intruders, interlopers of all kinds. Ants recognise their friends or fellows after absence (Darwin and Lubbock), and they distinguish friends from foes (Westwood). Sentinel bees know strangers, enemies, or intruders, and deal with them according to their character; they also know the person of their queen (Figuier).

The recognition of *things* and the appreciation of their significance are quite as common as the recognition of

persons and the appreciation of their relation to the animal observer. A terrier that had a very marked attachment to its master's house roused the whole household one night because one of several bars or bolts had not been shot in the front door—had been forgotten, in fact, when the door was locked and barred for the night ('Animal World').

A deer hound of Berkeley's knew whether its master was in or out of the house by looking for his hat in the lobby. If the hat was gone and its master was out, it went to the highest window in the house and looked for him in every direction. Rooks distinguish a man that carries from one who does not carry a gun, regarding the one as dangerous, the other as harmless (Watson). A similar practical distinction between armed and unarmed men is made by baboons and apes, the hippopotamus, eagle, buzzard, and many other animals, flight being a common result in the one case, composure in the other. The fishing cormorant of China knows its own boat—that to which it is attached—in a whole fleet of fishing boats (Fennel). The military horse knows the uniform of its regiment. Many dogs recognise their masters' property when stolen or lost.

As regards recognition of *place* or locality, very little need be said. So-called 'railway dogs' know the several railway stations, and, on stoppage of the train, get out of or remain in the train, as the case may be. Cats recognise home after an absence (Watson). Many migratory birds that return year after year to the same nests or nesting places must know them by some sort of headmark. Bees distinguish their own hives (Kirby and Spence).

It is its keenness of *observation* that leads the dog at once to perceive anything *unusual* in its master's looks, manner, or habits, and gives rise to suspicion or discovery of his intentions (Houzeau). And it is the superior closeness of observation, the more incessant carefulness or watchfulness, on the part of dogs and cats as compared with man, that lead him to give the animals in question credit for certain kinds of *presentiment* or prevision—for instance, as to threatened danger.

Without any sort of outward indication, by reading

merely the scowl or the reverie, by interpreting some sudden change of appearance, manner, or habit, in connection perhaps with some criminal action on its own part, by the association of ideas and the rapid drawing of inferences, the dog or cat frequently discovers that a master has made up his mind to shoot, poison, or drown it, and the natural and immediate action following upon such inference from the facts of observation is getting out of his way before he can put his intention into shape or execution.

It is obvious that many animals appreciate, and must therefore notice, not only *general effect*, but the most minute *details* that, in combination, produce this effect. We know that certain female birds at least appreciate *patterns* or designs—for instance, in carpets (White)—but it has yet to be determined whether female birds pay attention to each detail of beauty, of colour or form, in the males they admire and select (Darwin).

Not only, moreover, do they distinguish *colours*, as many animals much lower in the zoological scale also do—for instance, bees and other insects—but various birds notice even the different *shades* of the same colour. And it is shown in another chapter what is the effect of pictorial representations of persons and things on dogs and other animals.

It is important here to note that the behaviour of many animals differs according as they are, or believe themselves to be, observed or unobserved by man or by their fellows. Certain pet dogs have their 'company' as well as their natural manners, the former being reserved for the human society of the drawing-room, the latter being freely exhibited among their own fellows beyond their mistresses' ken—for these are usually ladies' dogs in every sense. The thievish dog or cat steals only when it is, or fancies itself, unnoticed. Before or after the act of theft it may be found sitting or reclining demurely and with an air of utter innocence in its accustomed place before the parlour fire, or it may be seen casting keen glances in all directions—in fact, reconnoitring as to the coast being clear, precisely as a human smuggler would.

Curiosity, when it dominates over caution, leads many an

unfortunate animal into danger or death, for man, especially in the form of the sportsman, is never slow to take advantage, for his own ends, of the mental or moral failings of the lower animals. Their inquisitiveness is obviously based on—

1. Wonder or surprise at what is *novel* or unusual, and on a—

2. Desire to know the nature or properties of the object, animate or inanimate, that begets this wonder.

A curiosity or inquisitiveness, sometimes insatiable and demanding gratification at whatever cost to the animal, has been described in the dog (Cobbe), parrot (Darwin), New Zealand water-hen (Baden Powell), walrus, monkeys as a tribe, cormorant (Cunningham), goat (Wood, Baird), common fox (Anson), Magellan and Siberian fox (Houzeau), wild turkey and brent goose of North America (Gillmore), guanaco (Darwin, Cunningham), ptarmigan (Gillmore), orang (Houzeau), Polar bear (Hayes, Cassell), prong-horned antelope of North America (Gillmore), zebra-ichneumon of Central Africa (Schweinfurth), sheath-bill of Kerguelen's Land, and in oceanic birds and wilderness animals generally—those, namely, in whom the overruling fear of man has not yet been begotten by sad experience.

Of the zebra-ichneumon Dr. Schweinfurth says, 'I found it exceedingly troublesome on account of the pertinacious *curiosity* with which it peeped into all my cases and boxes, upset my pots, broke my bottles, with no apparent object but to investigate the contents.'

Dr. Hayes mentions a Polar bear that 'seemed to be fascinated with the steamer, and her curiosity got the better of her discretion,' costing her the loss of her own life and that of two of her cubs; and the same Arctic traveller gives other instances of the same kind of fatal curiosity in the same animal. The prong-horned antelope is frequently brought within range of the sportsman's rifle 'by waving a coloured handkerchief or other unknown object' (Gillmore). Similar advantage is taken of the curiosity or wonder of the wild turkey and brent goose to get them within the sportsman's range. Of the brent goose of Chesapeake Bay, Maryland, Gillmore tells us that 'even while out of sight . . . .

it may frequently be called within gunshot by waving a pocket handkerchief.'

The guanaco of South America also owes its capture by the hunter to its *inquisitiveness*. These hunters 'lie on the ground, kicking their legs in the air and performing sundry strange antics. The guanaco cannot resist the temptation of approaching the strange object, and is shot by the hunter as soon as it comes within range. Even if it be missed it will not run away, evidently considering the flash and the report to be part of the performance' (Darwin).

It is *curiosity* that leads frequently to a prying inspection or *examination* not only of man's works but of himself, of the one as strange articles, of the other as an unfamiliar or new animal. This habit in the Arctic bear is often useful to sailors in enabling them to save their lives. In their flight, if they throw down successively handkerchiefs or other articles, especially if brightly coloured, the pursuing animal carefully examines them one by one, an inspection that occupies time, which, while lost to the bear, is gained by the sailors (Cassell). But examination is prompted by other considerations than mere curiosity and a desire for satisfying it. A much more common reason for the careful inspection of a person, other animal, or thing is to determine—

1. Whether it is dangerous or harmless.
2. Whether it may subserve any useful purpose to the examiner.

Many birds scrutinise keenly all man's operations and their results. Other animals examine new objects with distrust and precaution. The prairie wolf makes a very deliberate inspection of all forms of snare, trap, or bait.

Examination frequently includes or involves more or less systematic and protracted *search*, research, or exploration for or of—

1. Forage fields.
2. Water supply.
3. Lost young.
4. Lost or stolen articles of man's.
5. Their masters' persons.
6. Booty or spoil of all kinds.

7. Materials of construction.

In their regular *search* for water supply the dog, horse, mule, ox, goat, and other animals *explore* new or unvisited localities (Houzeau). The theftuous monkey ransacks man's pockets in pocket-picking. The bereaved bitch or cat makes the most anxious and unwearied search for her lost young, and female birds for their abstracted eggs. Hounds or other sporting dogs seek carefully for the track of game—for instance, the foxhound for that of the elk in Ceylon (Baker)—such a search including the fording or swimming of lakes and rivers.

Rat-catching terriers explore houses in search of their prey. Both cats and dogs sometimes *seek* for their masters at the houses of their friends, or even in large assemblies, such as balls or public meetings (Watson, 'Percy Anecdotes'). Both cats and dogs, too, search enquiringly and anxiously in a master's or an enemy's eye or features for his or its intention towards them. Monkeys make the closest examination of bark and leaves in their search for insects, of the hair and skin of the dog in looking for vermin (Belt).

Examination sometimes includes also *researches* or enquiries — reconnoitring and surveys — with corresponding reports by commissioners, pioneers, delegates, spies, scouts, sentinels—in war, foraging, marauding, slave-capturing, or colonisation. Horses and cows frequently make *surveys* of fences, in order to the detection of their weak points, as offering a means of escape or of access to some coveted pasture. Macaulay, for instance, mentions an old mare making a regular tour of inspection of such a kind round an enclosure. The avant-couriers of swallows in migrating appear to make both surveys and reports. Certain Californian ants *reconnoitre* as to the presence or absence of danger (Hague), which is also done by a great variety of higher animals, including the wild horse and elephant (Watson) and the spider-monkey (Cassell).

Much of the knowledge acquired by the lower animals is the result of direct *experimentation* by themselves. They *test* or try in various ways—

1. The mechanical properties of bodies.

2. Their dangerousness or power of inflicting pain.

3. The best means of effecting a given purpose.

One of the commonest objects in their experimental investigations is to ascertain the *strength* of material, in reference especially to its capability to support given body weights or mechanical strains. Thus orangs, before climbing trees, 'test the branches, as to whether they will bear, by shaking them' (Büchner). Cingalese elephants try the strength of bridges before trusting their body weight on them, 'using their foot and trunk, and refusing to venture upon the bridge if vibration is at all perceptible' (Baker, Watson).

Berkeley tells us of a retriever trying the strength of ice, and looking for a convenient and safe place to cross a frozen brook.

Certain animals, again, test the *temperature* of various fluids or solids. Thus Berkeley reports a male parent bird trying the varying heat of a nest of short-mown grass, which became warm by fermentation. He visits it when full of eggs 'very frequently, and tries the temperature with his foot. If too hot, he decreases the grass around the eggs; if too cold, he heaps on more grass.' Monkeys sometimes try the heat of warm water by the cautious and gradual introduction of their feet or fists—just as man estimates the temperature of his bath by inserting his fingers or hand.

Other animals test the *quantity* of fluid in a given vessel by the use of their paws or feet. The cat, for instance, sometimes gauges or measures the quantity of water, milk, or cream in a jug—ascertains the lowness or highness of its level, its accessibility, or the reverse—by means of its paw ('Animal World'); and the rat probably does the same by the use of its tail.

Experimental investigation usually or frequently implies both *repetition* and *variation* of *effort*, frequency of attempts to attain a given end, involving diligence, perseverance, determination, with change in the mode or means employed, necessitating ingenuity, adaptiveness, reflection, comparison. In order to success in attaining an object, or accomplishing a purpose, *repeated trials* may be made of the same kind, as well as of different kinds. Thus birds that break shells on stones

by dropping them from a height upon, or by using their beaks to hold them and dashing them against, some hard substance, such as a stone or a rock, may simply vary the height, the hardness of the stone, or the force of the blow, in their different attempts.

As in man, investigation of all kinds in other animals requires the use of the senses and judgment; the application of such faculties as memory, reflection, comparison, inference. But it by no means follows that the lower animals arrive at their conclusions, acquire their information, their experimental or other knowledge, by the same use of the same *senses* as in man.

On the contrary, we know that certain senses are used by the lower animals in a different way from that in which they are employed by man. For instance, there can be no doubt that the dog acquires by sniffing or smell information that man usually obtains by the use of vision. We are too frequently at a loss to determine what senses have been operative in the acquisition of given knowledge by so familiar an animal even as the dog—what has been the part played respectively by each of several senses, perhaps. Some of man's artistic representations of fire—for instance, in lobby grates—are sometimes so good as at first sight to deceive a dog.

But the animal submits what it soon comes to suspect is an *imposture* to investigation, by observation, by touching, by sniffing or smell. It applies tests, and makes experiments with one sense after another, or with all combined, and then applies reflection, comparison, judgment, to the determination of the nature of the deceptive appearance. Its suspicion that a mere imitation stood for a reality was probably produced by such physical facts as the absence of heat and of motion in the apparent flame.

The horse, too, sniffs or smells, as well as looks at, unfamiliar objects—brings all its senses and intelligence to bear on the investigation of those that are, therefore, presumably dangerous.

CHAPTER IX.

EDUCATION OF ANIMALS BY MAN.

THE education of other animals by man is either—

1. *Direct* and intentional, for some specific purpose of his own, in which case it is usually thorough and systematic; or—

2. *Indirect* and unintentional, the result simply of association with him, of the influence of his habitual example and behaviour.

Direct and deliberate training by man may be for good or for bad purposes, or for those which can scarcely be designated either the one or the other. Its object is, usually at least, his own selfish ends, either of profit or pleasure, or both. This may be best seen in a consideration of some of the chief *results* of man's training, which include the following:—

1. The *feats or tricks* of performing or learned animals, among which are dogs, horses, cats, elephants, canaries, parrots, and even fleas: e.g.—

   a. The articulation of words and phrases—the use of *speech*—by the parrot and certain other birds, including the acquisition of human language and the knowledge of more than one of man's languages.

   b. A certain kind of orthography or *spelling*, consisting of the arrangement in words of the letters of man's alphabet, including the *correction of errors.*

   c. A sort of *writing*, involving the skilled use of the paws.

   d. Feats of *jugglery.*

   e. *Gambling*, or playing tricks with cards.

f. Playing *games* of various kinds with man.

g. Feats in *arithmetic*, or the calculation of numbers.

h. Reading the *clock*, involving a knowledge of figures, if not also of numbers or time.

i. Reading or understanding figures on *cards*, patterns on carpets, pictorial illustrations of persons, other animals, and things.

j. Feats of *song* and whistling, including the performance of operas and concerts, involving the taking of parts.

k. The performance of certain kinds of instrumental *music*, by such animals even as swine and cats, elephants and bears, the two latter playing the organ (Pierquin, Bisset)—including the keeping of time as well as a knowledge of tune.

l. Histrionic or *dramatic* representations, in which, as in concerts or operas, different animals 'play' appropriately their different parts, including the *simulation* of human character, of military exercises, of declamation.

m. Feats of *agility* by the monkey, and even by the horse and bear—such as walking or tumbling, as well as dancing to music, on the tight rope or otherwise, trundling wheelbarrows on the tight rope, firing cannon by pulling the string of a trigger, bell-ringing.

n. The development of *politeness* or manners, including salutation, behaviour at table and in man's society.

2. *Services to man.*

a. Acting as valets or *servants*, including the calling of servants or awaking of masters, opening door to visitors, handing them their hats, and showing them out.

b. Acting as *messengers* or porters, including especially the conveyance of printed or written intelligence of the first importance by homing pigeons during war, the delivery of newspapers, fetching and carrying groceries, butcher's meat, and bread.

c. The guidance of the *blind* or helpless.

d. The discovery of *lost* travellers and property.

e. The *defence* of persons or property.

f. The *saving of life* in shipwreck or otherwise.

g. The *capture* and home-bringing of runaway or stray animals.

h. The *guidance* and guardianship, including the nursing, of children; the management of teams of horses and flocks of sheep.

i. *Hunting* down certain animals so as not to injure their fur.

j. The bearing, draught, and carriage of *burdens*.

k. *Begging* for behoof of their masters, and so supporting them.

l. Capturing or *collecting food for man*, as in birds or dogs fishing for their human masters, including, for instance, the gathering of cocoa-nuts by monkeys as hired labourers, described as 'monkey coolies,' in Ceylon.

m. The performance of various *duties*, mostly of a mechanical nature, some of them, however, requiring a considerable amount of mental exertion, such as—

1. Drawing carriages or guns.
2. Piling timber.
3. Fitting drain or other pipes.
4. Turning kitchen spits.
5. Working the bellows.
6. Tending engine or other fires.
7. Playing the barrel organ.

n. The judicial *punishment of man* or other animals, the execution of man's sentences on fellow-man, as by the elephant in India or the blood hound in Cuba.

o. *Use in war*, in aiding or defending man—for instance, in the intimidation of his enemies—including the display of coolness in battle.

p. Various *arts of deception*, such as those involved in smuggling and brigandage.

q. Various *crimes*, such as—

1. *Theft* in all its degrees, up to highway robbery.
2. The *murder* or mutilation of man or other animals, for the purposes of revenge or for other nefarious purposes.

3. *Services to themselves.*

a. The use of *money*, including buying or purchasing by the dog.

b. *Begging* for their own behoof.

4. *Services equally to themselves and to man* include, for instance, the restraint imposed upon their natural appetites, the wonderful *self-control* of which they become capable.

This *self-restraint*, or self-denial, while it is one of man's greatest educational triumphs, is alone sufficient to repay him for all his trouble, foreshadowing, as it does, the yet hidden *possibilities* of what he may achieve from the domestication and moral education of the anthropoid apes. Thus the truffle-hunting dog, a small dog bred from the French poodle, though very fond of truffles, never eats them, 'being trained not to do so.' The shepherd's collie is similarly taught not to touch milk, while in other dogs the restriction refers to the even greater temptation of uncooked flesh of various kinds.

The useful *accomplishments* of the lower animals, the result of man's training, may be studied as illustrative, on the one hand, of what may be achieved by a single human teacher, and, on the other hand, of what may be exhibited by a single animal species.

An idea of what *one man* can do in developing the mental and bodily powers of animals may be gained from a study of the animal feats which resulted from the labours of *Bisset*, the animal trainer or teacher of Perth. He had animals of the most diverse genera and species thoroughly under command; in his hands they became pliant, obedient, good-natured. He developed in them good manners; taught them to offer obeisance or greeting to their audience or spectators for he exhibited his performing animals before great assem-

blages of people in London and other large cities); substituted tractability for obstinacy in such an unpromising animal as the pig; caused different individuals, genera, or species to act in concert (for instance, in part-singing or operas); made them useful in going messages or fetching and carrying according to orders.

Among the feats he taught—the very varied accomplishments his pupils acquired—were writing, arithmetic, spelling names, telling hours on the clock, playing tunes on the dulcimer, turning the barrel organ or beating the drum, dancing, riding and tumbling on horses' backs, tumbling and dancing on the tight rope, the use of the paw in drinking healths or holding candles.

On the other hand, among the tricks exhibited by learned or performing *elephants* alone: are—

1. Emptying soda-water bottles.
2. Folding their own saddle-cloths (Watson).
3. Public, military, or other salutes (Pierquin).
4. Speaking or talking of some kind.
5. Piping or whistling, or other forms of music, vocal or instrumental.
6. Gymnastics.
7. Theatrical or dramatic representations.
8. Mechanical or engineering skill.
9. Bell-ringing.
10. Organ-playing.
11. Obeying man's word of command or order.
12. Rope-dancing.
13. Dining at man's table and behaving with decorum, though necessarily after a clumsy fashion in contrast with that exhibited by certain anthropoid apes.

The *orang* can be trained to sit at table and conduct itself with all due decorum or propriety; to become a servant, waiting at table and performing other domestic services (Watson, Cassell)—all in a notably human fashion. The *chimpanzee* shows in various ways a similar humanlike or civilised behaviour. For instance, he sometimes takes his food like a man, making use both of man's foods and beverages, as man uses them. He helps himself to wine; drinks hot tea,

sugaring it, pouring it into a saucer, and waiting till it cools. He has been trained also to the domestic service of man, as he has been to man's companionship. He has been taught to feed and attend a baker's oven-fire on board ship, to act as galley fireman, regulating the temperature (Cassell, Houzeau).

A well-known female *chimpanzee*—now dead—of the Zoological Gardens of London, 'eats her egg with a spoon, takes her grog daily, and it is said that, when on board ship, she mixed the latter herself. She will lock and unlock a door or drawer; will thread any needle. She cannot be taken in [deceived] with the same thing twice.' She is described as 'shaking hands in a very cordial manner with some children. . . . In taking her meals on the passage home she used knife, fork, spoon, and drinking-cup with the same ease as a human being; and, with whatever food she was supplied, she preferred using a fork or a spoon to convey it to her mouth to holding it in her hands.'

The chacma *baboon* has been taught to blow bellows and to drive teams of waggon-horses (Baird). Other baboons have acted as torch-bearers (Cassell), and were employed in domestic service and as workmen or artisans by the ancient Egyptians. Large apes are now regularly employed in the Straits Settlements to pull cocoa-nuts, being 'imported from Acheen in batches like coolies, and are marched round the plantations by their owners, who let them out on hire.' They are 'said to select suitable fruit with great discrimination, and to twist the nut round and round until it falls.'[1]

The commoner *results* of man's education of other animals include the development of *good behaviour*, which involves such qualities as—

a. Quietude.
b. Obedience.
c. Self-control.
d. Docility.
e. Honesty.
f. Self-denial.
g. Sympathy.
h. Respect.
i. Coolness or calmness.
j. Industry.
k. Regularity.

Among the many practical advantages, or *results*, of

[1] 'Scotsman,' February 11, 1875.

man's education of the domestic animals is this, that such animals as the elephant, horse, ass, mule, dog, orang, and chimpanzee, for instance, can often work *without* a master's *supervision*, direction, or even presence—that is, when they have been thoroughly instructed in the duties required of them. In other words, a certain spontaneity of action is acquired, the result partly of habit, partly of willingness, partly of pleasure taken in the work itself. They come to do things of their own accord, habitually, almost automatically, readily, which at first were done only by command, in a master's presence, and as the result of gradual, systematic, long-continued, laborious training.

This, in fact, is one of the many triumphs of the education of the lower animals by man, one of the many strong and utilitarian arguments in favour of its being thorough. His labour is repaid in the assistance he derives—in the co-operation or service of the animals on whom he so well bestows his efforts. The elephant, if only it be shown its work, and understands its nature and its master's object, may be trusted to do it without supervision and with wonderful skill, energy, and perseverance (Houzeau). The dog goes messages wholly without surveillance. 'Performing' dogs may be daily seen in the streets of London going through their performances by themselves, and not even for the benefit of themselves. For Grenville Murray mentions one whose decrepit, blind beggar-master was confined to bed, while his dog's performances were the sole means of his obtaining an income and thereby life-support.

It is creditable to human sympathy to be able to say that, so far as the collection of coin was concerned, the sagacious animal's tricks were more successful when performed in the absence of all human supervision or accompaniment than had the poor beggar himself been present. Houzeau speaks of a French butcher's dog that conducted both cattle and sheep alone, unaided, unseen by its master.

Animals that are in the habit of doing certain things under certain circumstances—have been trained to do so by man, but under his auspices—sometimes act without orders *on their own responsibility*, in his absence, taking for granted

or assuming what his wishes or intentions would or might have been; or perhaps simply through force of habit, and as the effect of discipline—when the same circumstances arise acting in the same way.

Habit in relation to education is a subject of much interest—as it is illustrated, for instance, by the life-lasting results of systematic and judicious training in the form of military or other *discipline*. Such is its effect in fighting elephants in India—purposely rendered ferocious—that they obey their mahouts 'even in the utmost height of their fury.'[1] A runaway tame elephant that was captured among a herd of wild ones eighteen months after its escape, being ordered to lay down, 'immediately obeyed the familiar word of command and became perfectly tractable.'

Another that had been at large for fourteen years, 'on being recaptured, remembered her former driver, and instantly lay down at his order' (Macaulay). But the result is even more familiar and equally well-marked in the old cavalry charger when it hears again, after a long absence from the army, the trumpet call. The effect of its early training is seen even in panics or stampedes.

The *results* of man's training, whether for good or evil, are most frequently and readily illustrated in the dog, cat, horse, elephant, monkey, pig, bear; and in various birds, such as the parrot, parroquet, and cockatoo, and the song birds; and even in fleas. They may be seen or studied almost at any time in the menageries, hippodromes, or circuses of all kinds that perambulate the country, or that are stationary in large cities, such as London, Edinburgh, or Dublin. The wonderful feats of trained animals—of bands of dogs, for instance—may occasionally be seen on a smaller scale, but not less instructive form, in the street stages of itinerant musicians, especially on the Continent. The last exhibition I have myself seen of this kind was on a public promenade in Leipsic.

Man's education of other animals is frequently by *payment for results*—a principle that nowadays regulates so much of our own national education.

[1] 'Scotsman,' November 22, 1875.

Man's *methods* or means of tuition vary greatly in different men and in different animals. They include—

1. Various systems or forms of *reward* and *punishment*, especially the giving or withholding of necessary or coveted articles of food.

2. Various combinations of *kindness* and *firmness*, or kindness alone, including the development of love and confidence.

3. Various forms of harshness or cruelty, including the development of *fear*.

4. Acting on their—

a. *Love of approbation.*

b. Expectancy.

c. Desires or appetites.

5. The force of *discipline*, routine, habit—all long-continued.

6. A due recognition of each animal's *individuality*.

7. Due allowance has to be made also for age, sex, health, and other circumstances that may give peculiarity to each case.

8. The requirements of the teacher should include—

a. Great patience and perseverance.

b. Perfect command of temper.

c. Much kindliness to and sympathy with his pupils.

There are thus certain mental qualities, some of them approaching the character of foibles, in the pupil that man has to take a legitimate or proper advantage of. Thus the *love of approbation* and of spectators may be regarded as amounting to vanity or self-conceit. There is a necessity for sedulously cultivating some one or more of these qualities, according to the special object in view—accomplishment to be acquired.

The effects of mere *association with man* include sometimes remarkable changes in an animal's character. Such association, for instance—

1. May either improve or deteriorate the character of such an animal as the dog, which is at once highly intelligent, observant, and impressionable; or—

2. It may render the character of the lower animal, notably of the dog, a mere *reflex* of that of his master.

In both cases it may be said that the character of the master determines that of his animal retainer—a circumstance that attaches to the former, as has been shown in other chapters, a high measure of *responsibility* for the behaviour of subject animals.

The effect of *man's companionship* in the production of *humanlike behaviour* is best illustrated perhaps in the anthropoid apes, in whom imitation is powerful, and who in structure and habit of body so closely resemble man. 'They become accustomed to wear clothes, drink out of glasses, use a spoon and a fork, uncork bottles, clean boots, and brush clothes, and are even said to be employed at the Cape in a number of useful labours of the house and field. . . . On shipboard they help to reef and furl the sails. They make themselves a bed with a raised pillow, show an inclination for ladies, light a fire and cook food, dust furniture, clean the floor, try to open locks. . . . Buffon's celebrated chimpanzee extended his hand to visitors, went arm-in-arm with them, ate at table, sitting and with a napkin, used fork and spoon, wiped his mouth, poured out a glass, fetched coffee, put sugar in it. . . . Bastian saw in an English man-of-war an ape sitting among the sailers, sewing as zealously as they' (Büchner).

Man's mere *companionship* is indeed an education in itself, whether for good or for evil. 'Like master, like dog' is quite as true as the adage 'Like master, like man.' His dog as well as his human retainer insensibly acquires something of his own character; such is the force of example and imitation—of what has been called *moral contagion* or sympathy. The resemblance may be simply ludicrous; the dog, and still more the monkey, may become a mere unintentional caricature of its master, as when it acquires his attitudes, gestures, or looks of *hauteur*. But the resemblance is quite as likely to be serious in every respect.

Thus the bull-dog, trained for mere fighting purposes in such a moral atmosphere as that of Hanley, is 'a morose and suspicious animal; but he has been made so by bad masters and his parents before him. He is a diseased, morbid specimen of the race' (Wood). 'He is . . . . an unsafe

companion even for his master, and is just as likely to attack his master as a stranger if his blood be up' ('Animal World'). This is only one, however, of many illustrations that might be given of man's evil training recoiling upon himself, of merited retribution, of the punishments of Nemesis.

'The natural connection between democracy and irreverence it was that led Plato to make the observation that even the dogs of Athens had a certain look of impertinence about them, which was not observed in Sparta' (Blackie). Various writers have pointed out that, according to the character of its master and his household, a dog shows humility or self-depreciation on the one hand, arrogance or impudent self-assertion on the other.

There may be said to be two great *antagonistic* courses of educational treatment pursued by man—viz. the rule or reign of—

1. *Fear* and
2. *Love* respectively.

They lead frequently to the same apparent result—obedience in servitude. But the nature of the obedience and the motive of the service rendered are very different, usually and necessarily, in the two cases. In the first the result of severe discipline includes a constant *dread of punishment*, a compulsory and probably temporary tranquillity or docility, always marked, or liable to be marked, by *timidity* and nervousness, and in the horse by a tendency to shy and run off. In the second case there is a calm, steady confidence in, if not an attachment to, its master or rider, if the animal be a horse (Pierquin).

The Ettrick shepherd, Walsh, and other writers show, in regard to the shepherd's dog, how powerful an agency is *man's* kindly companionship in the development and cultivation of the animal's sagacity; how the shrewdness of the master reacts insensibly, but favourably, on the intelligence of his collie.

The pariah or outcast dogs of Indian cities, too, reflect the mildness and kindness of their masters, the Hindoos, and form a remarkable contrast to the same class of dogs

among the Turks (Low). The proverbial sagacity of the Arabian steed, its humanlike qualities of head and heart, arise from its intimate association with and education by man (Farley); and the same may be said in a minor degree of the Irish pig.

Woman's companionship exercises frequently quite as marked an influence as man's, both for good and evil, but unfortunately rather for evil than good. The constant association of pet animals—e.g. lap-dogs—with ladies in their boudoirs and drawing-rooms no doubt begets in some cases a certain politeness, manners that may be called refined or aristocratic; but these manners are apt to include an objectionable *hauteur* or superciliousness, while there can be no question as to the common development of *selfishness and jealousy*. In woman's case, however, such results may be due less to imitation of a mistress's character than to her injudicious petting and pampering.

Among the *advantages* of association with man is the development of powers that would or might otherwise remain *latent* (Houzeau). An animal's whole *moral nature* may not only be improved, but almost created. The quality of the *general intelligence* may be so much improved also as to appear different in kind from and inferior to the special skill to be found in other individuals of the same species. This is well brought out in the comparison instituted by Hogg, the Ettrick shepherd, between the home-bred collie—the dog that is left at home as a protector and a companion for the shepherd's wife, children, and homestead—and its brother that is taken or sent daily to the hills, that is specially trained to manage sheep. He tells us that the home-bred animals 'are far more acute at taking up what is said in a family'—that is, they understand more readily and fully the import of man's conversation. But the evils or defects that sometimes at least attend or characterise *special training* are of a more practical and serious kind.

Thus Hogg says of one of his collies, specially trained to accompany him to the hills and to manage sheep, 'if coming hungry from the hills and getting into a milk-house, [he] would most likely think of nothing else than filling his

belly with the cream;' while another individual, a member of the same litter or family perhaps, that remains at home as the playfellow of the shepherd's children and the guardian of his other household gods, 'is bred at home to far higher principles of *honour*. I have known such [a dog] lay night and day among from ten to twenty pails full of milk, and never once break the cream of one of them with the tip of his tongue; nor would he suffer cat, rat, or any other creature to touch it.'

On the other hand, among the *disadvantages* of association with man are the savagery, ferocity, stupidity, and want of affection that characterise, for instance, the bulldog, none of which qualities are natural to the animal, though they are the natural fruits of its evil up-bringing by man (Walsh).

The effects of the *up-bringing* of young dogs or other animals *with children* are frequently very remarkable ('Animal World'). Thus bear whelps brought up in the same nursery with children, in intimate companionship, become even amiable. Bad humour is rare; they learn to behave themselves even at table, as well at least as their child companions do (Cassell).

Domestication is virtually a form and process of education, in which man's object is to render certain animals his slaves or servants, companions or pets, his beasts of draught or burden, his sources of food supply or his means of amusement. He cultivates alike their physical and mental nature in the directions that are to be useful to himself. His system of training, where he has a system, is determined solely by considerations of direct and obvious *utilitarianism*. He makes no special effort to develope either their moral nature or intellectual faculties for their own sakes, in order to greater moral excellence or a higher kind of knowledge.

And yet there can be no doubt of the increased economic value, as companions, playthings, or servants at least, of animals highly educated, morally and intellectually. Man's truest economy or policy, his highest privilege and most obvious duty, is, where he makes any use of subject animals (unless for the mere purposes of food), to educate thoroughly,

to the fullest practicable extent, *all their faculties* or powers, moral, intellectual, and physical.

Domestication in the case of the Quadrumana involves a high degree of what may be quite properly called *civilisation*, including the acquisition of domestic habits—for instance, as to behaviour at table, bed-going, visiting, and equitation. This has already and specially been pointed out in reference to the orang and chimpanzee, chacma baboon, and various apes.

Domestication involves a certain kind or degree of *mutual* understanding, attachment, confidence, sympathy, and sociability, a desire to please as well as a readiness to be pleased.

In *domestication* various noteworthy physiological transformations take place, including the loss of certain natural aptitudes or habits and the acquisition of new ones (Elam). A marked change of disposition usually occurs (Spencer).

But these changes in the temper or intelligence or mode of life are not always for the better. Nor are they all to be attributed to education, whether indirectly or directly. They are due partly to alterations in food, drink, temperature, humidity, altitude, climate, shelter, and occupation; they include the results of an unnatural mode of life, with its involved deprivation of exercise, freedom, and gratification of the sexual or other instincts, as pointed out in the chapter on the 'Mixed Causes of Mental Derangement.'

The practice of *domestication* of other animals, other genera and species, is not confined to man. There are certain other animals that resort to the practice, with the same kind of objects in view—ministration to their own physical wants or comforts—for the sake of their service or produce. Thus certain ants keep certain Aphides, just as man keeps *milch cows*, the Aphides being trained to yield their honeydew in the same way as the cow is trained to give up its milk.

There are certain other ants that capture and train other species as their *slaves* or servants, to do their work and wait upon them; and there is a certain kind of domestication—there is at least the subjection of one animal and its will to

the superior power, intelligence, and will of another, the subservience of a weaker to a stronger animal—in the case of apes that lay hold of dogs and use them as man does the horse—ride upon them or otherwise employ them as beasts of burden.

Domestication and *taming* may be synonymous; but they are not necessarily so, for it cannot be said that all animals that are tamed by man are domesticated. Domestication implies perfect resignation to man's power and sovereignty, as well as free and full companionship or fellowship. All this exists in the case of the dog, cat, horse, elephant, ox, pig, and our common fowls and song birds. But it cannot be said to occur in the case of the majority at least of menagerie animals—of those exhibited in our Zoological Gardens.

In the itinerant exhibitions known as '*happy families*' even the tameness is more superficial than real; the apparent harmony is liable to be disturbed—for instance, by the pangs of hunger or by fright. Nevertheless they are wonderful and suggestive illustrations of man's power of so training the most unpromising animal pupils as to lead to the control, unless under exceptional circumstances, of their strong natural instincts, appetites, or passions. It is astonishing what man can achieve in the taming of animals by the practical application of such qualities as patience, perseverance, sympathy, kindness, mercy, if only the animals are taken in hand at a very early stage of their growth.

Frederick Cuvier mentions a tame wolf that, thus trained by man from the youngest stage upwards, became 'as tractable as a dog.'

Sir John Lubbock contrived to tame the wasp. The reputedly intractable otter has been tamed and taught to fish for man's benefit instead of its own (Baird). The taming of a brace of butterflies, and teaching them to come at call, is mentioned by Wood. Many apparently dangerous wild animals have become by training substitutes for the dog or cat as house pets or for the horse as beasts of burden —e.g. the Cape hyæna, Madagascar lemur, American skunk,

Egyptian ichneumon (Houzeau), buffalo, tiger, bear cubs, vulture, and various snakes. In short, it may be said that all kinds of wild animals can be subjected successfully to the process of training, so as to become man's playthings, companions, or servants—a circumstance that very properly forms one of the most conspicuous and commendable of man's triumphs in the education of the lower animals.

The difference, however, between mere *taming* and domestication probably depends, frequently at least, on the different *methods* of education employed by man. Where fear or terrorism has been used instead of kindness or love, the resultant obedience or *subjection* is apt to be unreal, insecure, insincere, and shortlived.

The tameness of captive animals is, or may be, more apparent than real. It is at least not to be trusted in the case, for instance, of the large, fierce, predatory Carnivora, in proof whereof the accidents to man that every now and then happen from menagerie animals may be cited.

It has to be observed also that the term *tameness* is frequently misapplied, used improperly, for that *fearlessness of man* which arises from unfamiliarity with him as an enemy. It is in reality simply an absence of the acquired fear of man, because as yet the confiding animal has had no experience of his treachery and is aware of no reason for getting out of his way.

As in other forms of education, there must be in taming a due combination of the *suaviter in modo* with the *fortiter in re*, the one or the other predominating in individual cases. Thus lion-taming is brought about by a judicious combination of *kindness, firmness, and severity* (Buckland).

Much depends also on the capacity or qualifications of the teacher or trainer. It has been noticed by travellers that there is a singular difference in the capacities of civilised and *savage* man to tame wild animals, the savage possessing the great advantage of a superior knowledge of the habits and dispositions of his animal pupils, as well as a keener sympathy with their feelings and requirements.

The *economic value* to man of animal education appears to be little, if at all, considered—the usefulness to him of

educated compared with uneducated animals—and yet this can be readily shown by the uselessness of certain untrained or imperfectly trained individuals, and the usefulness of certain others, highly trained or properly educated, of the same species. Thus we are told of the uselessness of the Australian cattle dog from imperfect training (Baden Powell), while the converse—the high value or usefulness of the trained sheep dog at home—is too well known to require any sort of proof here. The Scotch shepherd not only saves himself endless trouble, but his master much money, by training his dog to the gentle yet firm—in other words, judicious and skilful—management of his charges, the sheep.

CHAPTER X.

EDUCATION OF ANIMALS BY EACH OTHER.

It is one of the many delusions under which man labours in regard to the mental characteristics of other animals that the lower animals are born with all their faculties *perfect*—that the young duck swims as well as its mother, the young bee builds its cell as well as its sire, and so forth—but the fact is that at least many young animals require tuition for the proper development both of their physical and mental nature, just as the human child does.

And the degree and direction of development depend very much on the kind or character of the education employed. In a great many cases the direct influence of the parent or parents is obvious; in others it is not so. But, whether it is so or not, various kinds of *self-tuition*—the teachings of *experience*—exist among all the higher and more intelligent animals.

There are also sundry cases in which older, experienced animals, who are not the parents of their pupils, teach the young and inexperienced, or those that are, while mature in age, inexperienced in certain kinds of practical knowledge.

It is frequently, indeed, necessary to educate young animals in so essential a matter as the avoidance of poisonous *food* and the selection of that which is suitable. They have to be taught, moreover, how best to procure what food is appropriate, the manner of seizing and eating it, the search for and pursuit of prey. As is pointed out in the chapters on '*Error*,' from ignorance or inexperience even animals of mature age are constantly making mistakes as to what food and drink to select or to avoid. The chicken has to learn

not to eat its own excrement, as well as how to drink, according to Spalding, who describes the awkwardness of its first attempts at eating and drinking.

Falcons teach their young to catch and eat their prey in the air, using at first dead mice, then wounded individuals, and lastly living and lively ones. Here is a good instance of the use of graduated or *progressive lessons*, and a satisfactory proof of *intention* in instruction. Ants teach their young to open their mouths for food (Houzeau). Parent partridges show their young 'the food suitable for them, and teach them how to procure it by scratching the earth with their claws' ('Animal World'). The cat teaches her kitten its future duties in mouse-catching and hunting, greediness being sometimes reproved; and the bitch treats its pups similarly in regard to rats, as has been depicted on canvas in one of Landseer's celebrated paintings.

Young sea-lions have at first a great aversion to water, and are taught to swim by their mothers (Clarke). The eider duck too gives its offspring *lessons* in swimming, the sea swallow in fishing, the eagle in flight, the horse and mule in the application of cautiousness and adroitness in the avoidance of obstacles. The cat developes muscular agility in her kittens by leading them to play with her tail.

The cow and goat instruct their young in the use of the head as a weapon of offence and defence, teaching them, as a fencing master would his pupils, how to make and avoid thrusts. Parent rooks teach their young first to hop and then to fly; the young make *experimental* voyages, and they are *encouraged* to effort by sounds and gestures in their parents (White).

Here too we have *graduated lessons*, and procedure on the part of the mother teacher suitable to the age and progress of her pupils. The swift teaches her young alertness or alacrity (White). In the swallow there is *systematic* tuition or training by parents ('Percy Anecdotes,' Wingel). It is the special business of the neuters among the Hymenoptera to instruct the young (Houzeau).

Among other animals that educate their young in such useful qualities or accomplishments as industry, food-selec-

tion, the use of proper precautions against danger, the estimation of the kind and amount of peril, present or threatened, the determination of the necessity or propriety of flight or migration, and of the means of setting about either, is the wolf (Low). The cat teaches caution and domestic cleanliness to its kittens ('Animal World'). Many bird parents teach song—e.g. the wren ('Percy Anecdotes'). Many young birds require tuition in song, inasmuch as they are not natural songsters (Darwin).

There are many cases in which, as has been already said, the young are taught by elders or seniors who are not their parents. This includes the category of *foster parents* and foster young, where the teacher and pupil belong to different genera or species. Thus we are told of an old cat giving a young one, not of its own progeny, 'a lesson of patience or self-denial, or imposing a fear of punishment' ('Nature'), and of another, a disabled old tom, teaching a young one, not its own, to avoid the bustle and moving merchandise of a London city warehouse (Wynter). Old mules *encourage* young ones, as they also do each other, to perseverance or exertion (Watson).

There are certain other cases in which animals train or teach each other, though they do not stand in the relation of old and young and do not belong to the same genus or species. In the first place, animals that have been trained by man are sometimes employed by him to teach their own fellows. Thus, in the training or breaking in of sporting dogs, old, thoroughly trained, 'well-bred' dogs are used in teaching the young—man here, however, supervising the process and progress of tuition. On the other hand, wild horses sometimes teach domestic ones their own vices (Baden Powell), by the force of temptation on the part of the seducer and of imitation on that of the seduced.

This teaching of *vices* or tricks to each other is noticed also in sporting dogs (Walsh). The ape, in breaking in the dog for riding, does so on the principles employed by man in breaking in his horses (Houzeau).

The following features are common in the *instruction* of the young by their parents or seniors. In the first place, it

is direct and voluntary (Houzeau). It involves method and design—for instance, in the cat, that encourages the play of her kittens and that herself plays with them, such play being directly and obviously conducive to the development of bodily agility. In the tuition of the young, parents and elders apply in various ways their own experience. They employ equally commendation or reward and punishment or rebuke.

Among ants the masters teach or train their slaves in or by fear, though the result is good, as these slaves become true servants (Figuier). Pigeons are taught to fly by the medium of hunger, of physical need or necessity, artificially or intentionally created by the parent bird withholding food —just as man does in training his courier birds (Herbert).

In certain cases there is a *special* education of certain individuals, as of the queen by hive bees (Kirby and Spence); there is a distinctively *physical* training given to the young queens by bee-nurses (Figuier).

Certain birds and other animals set forth their own example to their young, with the evident object of its *imitation* by them; and there can be no doubt that it is by imitation that the acquisition of ability—physical and mental—takes place, in the first instance, in the young of all the higher animals, as is the case also in the human child.

On the part of the *pupil*, as has been partly pointed out in the chapter on 'Capacity for Education,' various mental qualities are implied. There must be, in the first place, a certain receptivity—a capacity for learning, as well as a willingness to learn. Then there is the powerful faculty of imitation, whereby young animals learn to do what they see done by their parents or seniors. Next there is natural *curiosity* or inquisitiveness, a desire to know the real nature of things—perhaps, in the first place, in reference simply to whether they are safe or dangerous.

This curiosity—thirst for knowledge—in many young animals leads to the development of observation, attention, investigation, and even experiment. In all kinds of instruction *memory* is of quite as great importance as in man. In certain animals there is not only anxiety to learn, but diligence

in study; they make efforts to excel, display an honourable emulation or rivalry — for instance, monkeys (Rengger). Moreover, there is a recognition of their parents or elders as their mentors (Houzeau)—a recognition that implies or includes obedience and respect.

Much more general, or at least more obvious, than the teaching of parents or elders is the teaching of *experience*. Young, intelligent animals rapidly acquire experience and profit by it, so that the behaviour of the old or experienced and the young or inexperienced animal, under the same circumstances, differs in a very marked way. Thus the different results of experience and inexperience are sometimes well seen in the same troop of military horses—in the different behaviour of old and young animals in stampedes or panics. Inexperience of man as an enemy is obvious in certain unsophisticated wild animals. Young harriers hunt without reflection, making no allowance for the doubling of the hare, while the old ones leave the fatigues of the chase to the young, themselves watching and waiting for their easier and proper opportunity (Houzeau). Experience teaches, in the first place, what to trust or to fear, what to eat, drink, or avoid, or what gives bodily pain. Thus a London railway dog was deterred, by its having been once burned by a red-hot cinder from the locomotive furnace, from travelling a second time by the engine or tender; it speedily learned to avoid what had produced danger and pain. Experience, too, enables hunted animals to avoid snares.

Animals apply their acquired experience to their conduct in new cases or circumstances. They profit by failure or non-success, which prompts them to make further and successful efforts. Thus the dog, in swimming, learns to make allowance for tides, eddies, and currents. Many animals profit by the very *accidents* that befall them. The bee does this after an attack on its nest by the death's-head moth; it accepts the incident as a warning of what is likely to happen again, and it forthwith makes provision for the contingency (Kirby and Spence). Bees also not only steady falling combs, but they learn this lesson from their totter-

ing condition—to strengthen other weak combs, so as to prevent a similar condition in them. They discover the cause of the fall in one case and the means of preventing a similar accident in other cases.

The lessons of *experience* have to be learned gradually or suddenly—frequently at great cost to the individual, its family, or race.

Just as happens in man, there are individuals among the lower animals so peculiarly constituted mentally that they do not gain knowledge from experience. This, however, is exceptional, and can usually at least be attributed to the presence of mental defect or disorder. The subject is fully discussed in the chapters on '*Mental Defect and Derangement*,' on '*Stupidity*,' and on '*Error*.'

It is of interest to bear in mind that experience is of two kinds—

1. That which is acquired by the *individual*; and—

2. That which has been accumulated by generations of individuals, and has been transmitted by or from *ancestry* (Lewes); while—

3. Of the two, ancestral, inherited experience is in certain respects the more important (Spalding).

Self-education, tuition, or improvement occurs in other animals, under the same circumstances as in man, involving the same mental qualities, developed or displayed in the same way. Various birds learn for themselves the songs or notes of other genera or species, and they have *concerts* among themselves (Darwin); at least they do so in confinement (Baird)—though it does not appear how captivity operates—possibly simply because then only is the acquisition noted or notable by man. Self-education includes, for instance, the learning of lessons by *practice*. Various song birds and other animals learn their lessons as children do. This takes place in the mocking bird ('Percy Anecdotes') and jay (Jesse). Elephants have their *rehearsals* by themselves, as was long ago pointed out by Pliny, and has been confirmed in modern times by Buckland; they practise for their dancing feats (Pliny). The horse too practises its dancing lessons. There is a regular *practising* by the young of manœuvres

prior to the migration of certain birds. The nightingale 'records' or practises the notes of other species.

'Practice makes perfection,' or at least tends towards it, in other animals as in man; steadiness in lesson-learning leads sooner or later to excellence. Practice has the same kind of effect in developing and improving the various mental faculties of other animals as in man. Its beneficial results are perhaps better seen in the efforts of song than in the arts of construction.

This learning of *lessons* involves the perception and correction of *mistakes*, and progress or improvement in song, flight, nest-building, and other accomplishments. It implies also what in man is called *study*, which is exhibited in various ways and degrees. Birds study, for instance, how best to display their own physical beauty (Darwin).

Self-tuition includes systematic muscular exercise—regular gymnastic exercises—in order to due bodily culture, even in insects—e.g. among young ants. The play of all young animals is to be regarded as an important part of *physical education*, as a means of imparting or developing that bodily agility which is so necessary in the struggle for life. Hence their mimic fights and races, their gambols, games, sports, pastimes of all kinds, have a high educational value, as well as an important relation to health, mental and bodily.

LANGUAGE.

CHAPTER XI.

LANGUAGE IN LOWER MAN.

PRESUMPTUOUS man never made a graver mistake than when he distinctively defined himself as differing from all other animals in the possession of *language*. He has fallen into error by ignorance of what language is—'any manner of expressing thought,' and, it may be added of expressing feeling, idea, wish, or intention. This is the comprehensive sense of the term—the sense in which it is used in this volume. It is the definition of the word according to the most recent English dictionaries.

Speech, articulate language, written and printed language, are mere *forms* of language, the forms with which civilised nations are no doubt most familiar; but they are neither the most common nor the most important forms of general language, which includes many kinds of what have been variously denominated gesture, sign, pantomimic or mimic, sound, look, and eye language. In other words, even in man the outward, visible, or audible exponents of feeling and thought are both numerous and varied—constituting a general language of expression.

Those forms of physical expression which are *not vocal*—for instance, the language of the look or eye—are frequently incomparably more powerful in their influence—more elo-

quent, more intelligible—than any of the ordinary forms of verbal, spoken, written, or printed language, appealing much more immediately to the heart if not to the head, to the feelings if not to the intellect. The language of simple *emotion* is used by man to a much greater extent than he is aware, frequently superseding what has been called 'intellectual' language by Carpenter.

Language is too much regarded as synonymous with mere *articulate speech*. We forget that the articulation or pronunciation of words—that verbal language—is not a native attribute of man, is not innate, but the result of imitation and training (Houzeau)—in other words, a gradual acquisition. We also forget the non-necessity for *words* in the formation of thought, in the interchange of ideas. We constantly lose sight of the possibility of thinking without giving audible expression to our thoughts, or of signifying our feelings, wishes, requirements, or intentions otherwise than by word of mouth, by writing, or by printing.

The student of comparative language cannot too soon disabuse himself of the notion that *words* are indispensable to the expression of feelings or ideas, that words are essential either to thought or to language. In all countries the dumb make themselves understood, and understand each other, or those who can make use of their special form of language, by means of *symbols*, sign language, or other substitutional modes of expression.

They cannot utter words, but they can write and read—those of them who are educated—and it would be absurd to deny to them the possession of ideas and feelings, the faculty of thought. Erasmus Darwin gives a case in which speech was lost in a deaf man by disuse, *gesture* language superseding it; so that, even in civilised races and individuals, articulate language requires cultivation and practice.

Unlinguistic tourists on the Continent manage to find their way and to get what they want by somewhat similar means—the use of gesture or *pantomime* language. I have myself found less difficulty in understanding, and being understood by, the natives of countries with whose printed or spoken language I was unacquainted, or imperfectly ac-

quainted, when I and they made use of *signs* or pantomime, than in understanding the verbal language of a London servant girl. The talk of the latter has been to me, in fact, sometimes quite unintelligible; it was impossible for me to understand either what she said, meant, or wanted.

I have not experienced similar difficulty in New Zealand with the Maoris, in Egypt, Syria, or Morocco with the Arabs, in Iceland with the Icelanders, or in Norway and other parts of the continent of Europe.

Gesture language alone is made use of by certain monks (Darwin). It is largely employed by some of the most highly civilised peoples possessed of a beautiful and copious spoken, written, and printed language—for instance, by the French—and the superior eloquence and intelligibility of their non-vocal forms of expression are frequently obvious to the English tourist in France.

The writer of a recent tract on the life of the factory girls of Lancashire says, 'I have seen girls in the Lancashire mills—perhaps a dozen or twenty yards apart—amid the deafening noise of spinning and weaving machinery, tell one another many a long tale on different subjects, the tender passion included, all by *motions of the mouth and arms.*'[1] The practice of some modern elocutionists—such as Mr. Melville Bell, of Edinburgh, in their methods of teaching the dumb to speak, shows that ideas can be conveyed by the mere movements of the lips without the utterance of any kind of *sound.* The late Sir Benjamin Brodie mentions a deaf girl who could tell her mother's meaning by the motions of her lips and the play of her features.

Again, what has been called the *dumb commerce* of Mexico, ancient China and Africa, and the modern East, shows that buying and selling, interrogation and reply, all the details of purchase or sale in the Eastern bazaar, can be, and are, carried on by gesture, symbols, hieroglyphic language, and *without words.* Many idiots express themselves only by signs (Ireland); and there is much *pantomimic* language also in the insane adult as well as in the sane child.

And, lastly, there is a *loss* of the so-called faculty of

[1] 'North British Daily Mail,' November 17, 1874.

language, of intellectual expression—which merely means the capability of giving expression in words to thought or emotion—in certain forms of organic disease of the brain, especially in those recently described as *aphasia* and *amnesia*.

Houzeau points out that in pre-historic man there was probably either no articulate language, or it was confined to mere interjections or *cries*, which form part of the vocal language of other animals. The earliest form of language in man is probably the expression of pleasure and pain, of joy and grief, of surprise and satisfaction. But the same emotion is frequently differently expressed by different races or individuals (Houzeau). The *cries* wrung from man under agony or distress are involuntary, spontaneous, and natural. They may be referred to what is called animal language, or emotional language, or imitative language, in contradistinction to that which has been denominated by Max Müller, Carpenter, Tylor, and others 'rational' or 'intellectual.' But this emotional language is at least as eloquent and as intelligible as rational language can possibly be.

The distinction between emotional and rational language is purely artificial. The one passes into the other, and both, in different degrees, are possessed by other animals as well as man. Tennyson describes the human infant, 'crying in the night' and 'crying for the light,' as having 'no language but a *cry*.' The language of the infant unquestionably consists at first of mere *cries* or *calls*, like those of many other young animals.

The savage, if he possess and express any sense of bereavement, does so by *cries* or *wails* (Houzeau). He employs noise, including cries, to terrify certain animals—e.g. the shark—just as the lower animals intimidate their enemies (Houzeau).

Various authors regard this simple animal cry as the rudiment of speech—the root of all verbal language.

Even in civilised man *grunting* occurs from surliness, and *growling* from dissatisfaction, anger, or resentment.

There are many peoples destitute of *written and printed language*, and not a few savage races that can scarcely be said to possess a *spoken* language, or even distinctly articulate speech. In certain cases their language—of whatever

character—is very limited or *rudimentary*. Thus certain aborigines of Borneo have no language of their own, and only learn with great labour to pronounce a few Malay words (Büchner). Savage peoples have frequently no mnemonic signs; the language of expression in them is much the same as it is in many animals. Thus their mode of salutation or greeting is not more expressive, consisting as it does either of—

1. Some simple gesture.
2. Touching noses; or—
3. Rubbing other parts of the body against each other.

Or their language consists of mere *inarticulate sounds* of the nature of shrieks—e.g. in certain natives of the Philippine Islands or among the South African Bushmen. Brazilian Botokudos 'speak little to one another, but rather mutually *grunt* and snuffle.' The Apache Indian 'speaks little, and rather in *gesture* than sounds.' The speech of the Fans of Western Africa is a collection of gutturals, unintelligible to white races; it 'can scarcely be called a language in the human sense of that word.' The talk of the savages of Borneo and Sumatra is described as a sort of *cackle* or *croak*. 'Generally savages are accustomed to talk more by gesture and *looks*' than by voice. Thus the Veddas of Ceylon use only '*signs*, grimaces, and guttural sounds (Büchner). Houzeau remarks on the paucity of letter sounds in savage languages.

Various classes of human *idiots* neither speak nor understand speech; others speak, but do not understand speech (Ireland). Their only voice-sounds are frequently mere *whines* or *cries* (Hitchman). Their defects or peculiarities of voice and speech have been commented on by many of those authorities who have had special opportunities of studying the phenomena of idiocy. One microcephalic idiot described by Professor Cesare Lombroso *chirped* like a bird; a second paralytic idiot, described by the same authority, 'cannot speak, or even converse by signs.' The absence of spoken language, non-understanding of man's speech, words, or phrases, howling or yelling by night and whining by day, are among the bestial traits or habits of the *wolf-children* of India.

Of one of them Gerhardt says, 'He has learnt to make sounds. *Speak* he cannot, but freely expresses his anger and joy.' Of another, 'They tried to make him speak, but could get nothing from him but an angry *growl* or *snarl*.' A third 'could never be brought to speak. He used to mutter something, but never articulated any word distinctly.' A fourth 'could not speak. He could be made to understand signs very well, but would utter sounds like wild animals.' A fifth 'could never be made to speak,' while a sixth 'could not be brought to speak, though it was easy to communicate with him by *signs*.' A seventh—a case recorded by Colonel Sleeman—'never could understand or utter a word, though he seemed to understand signs.' And Max Müller, commenting on the histories of wolf-children in India, refers to their *speechlessness* as a trait common to all.

On the other hand, there are many idiots, imbeciles, and lunatics that, giving up permanently or for the time their own language, speech—their use of words—*imitate the language*, along with the habits, *of various wild animals*. Thus the victim of spurious hydrophobia, who fancies he has been bitten by a rabid dog, and that so he has been inoculated with a dog's propensities, *barks*, *howls*, and *whines* like a dog.

Those persons who were affected with certain of the epidemic delusions of the Middle Ages—the fourteenth and fifteenth centuries—and who fancied they had been transformed into wolves, dogs, horses, cats, lions, cows, sparrows, or cuckoos, imitated the cries or notes of these animals, *neighing* like horses, *mewing* like cats, and so on, according to the speciality of their delusion. And, lastly, various simian, pithecoid, or apelike microcephalic idiots are as imitative as monkeys, mimicking all man's gestures.

Verbal language, then, is not innate in man, but 'a difficult acquisition,' as Grimm calls it, as gradual and difficult in the race as in the individual.

It may be supposed to constitute a certain linguistic *difference* between man and other animals that verbal language and the language of facial expression—physiogno-

mical control—are alike used so frequently in or by man to *conceal*—not to express—his real sentiments.

It may or may not be true that, as Talleyrand says, 'language was given to us for the concealment of our thoughts.' But it is certainly abundantly true that man frequently makes use of words to pervert or obscure his real ideas or feelings. It is, however, a mere assumption, and an incorrect one, that in other animals there is always a transparency or intelligibility of motive, feeling, or thought —that 'he who runs may read' the ideas, the wants, or wishes of his dog, for instance.

In point of fact, as is pointed out in the chapter on '*Deception*,' the language employed is not necessarily or always a key to the real emotions, desires, or designs of shrewd, cunning, ingenious animals. They are quite capable, for adequate reasons, of *masking* their real intentions—of misrepresenting their real condition, so as constantly to deceive man himself and throw him off his guard.

Even among the most highly civilised races of man, and in the most highly educated individuals, the natural, universal language of *emotion* asserts itself as dominant over all other, conventional forms of language. Dr. Gustav Jäger refers, for instance, to the simple emotional *cry* produced by intense feeling, such as the fear of death (Büchner).

Let us ever remember that, among even civilised races—

a. Different nations do not understand each others' language—spoken, written, and printed—without laborious study and incessant practice.

b. In the same people the written, printed, or spoken language of the educated is little, or not at all, understood by the uneducated classes; the language of the metaphysician or mathematician, theologian or poet, philosopher or man of science, is utterly unintelligible to the common run of the populace.

c. The application or use of mere spoken, written, and printed language is therefore very limited.

And on the other hand let us bear in mind that—

d. The only form of language which is universal in man and intelligible among all races and peoples is that which

is common to other animals, and equally useful to them and to man. Laughter and weeping, the shout of joy, the cry of alarm, the groan of pain, or the other sounds, the looks, attitudes, gestures, or other signs whereby both man and animals express their feelings of body or mind—constitute a common or natural language, understood as a rule by all races, genera, and species.

The mental phenomena of *deaf-mutism* in the most highly civilised communities, in relation to man's modes of expressing his feelings and ideas, are most instructive. The congenitally deaf and dumb, in whom the dumbness is the natural result of the deafness, are 'ignorant of all ordinary written and spoken language;' but, nevertheless, they are quite capable of education to a high degree.

This instruction of the deaf-mute is conducted partly by *gestures and signs*, whereby is imparted a knowledge of things. In a church for deaf-mutes in New York, we are told, 'one service every Sunday is conducted in the language of *signs*.' *Sounds*, therefore, are not necessary to the communication of ideas; a circumstance that is shown, moreover, by the fact that 'it is a common thing for a man to teach himself to read a language though he cannot pronounce it' ('Chambers's Encyclopædia').

Again, the expressiveness of *attitude* in man, in relation both to ideas and emotions, is well illustrated by the phenomena of *braidism* or hypnotism (Carpenter)—of what is commonly but erroneously described as animal magnetism, electro-biology, or mesmerism.

CHAPTER XII.

LANGUAGE IN OTHER ANIMALS.

In contempt, pity, or ignorance—or perhaps under the influence of all these feelings or conditions—man is in the habit of designating the lower animals 'poor *dumb* creatures.' The fact is, however, that they possess a language much more comprehensive than, and quite as eloquent as, his own—much more generally intelligible than is his *verbal language*, which is merely *one* form of language or expression—that only with which he, in his pride and prejudice, is most familiar.

Certain animals are not absolutely unacquainted with verbal language—with *speech*—as is shown in another chapter; but they have a very affluent language of sound, look, and action, capable of expressing not only emotion but ideas or thoughts, plans or intentions, wishes or requirements. Houzeau points out the *inferiority* of the language of certain savages to that of various animals, and Darwin shows the *superior* expressiveness to mere words of the inarticulate cries, which, along with feature-play, eye or look language, and gesture or attitude, are common to man with other animals.

There is sometimes a *superiority* in eloquence in favour of the lower animals as regards the mode of expression of the same emotion—for instance, of love and humility in the dog.

Man falls into many grave or absurd errors from his *ignorance* of animal language, which language naturally becomes intelligible just in proportion as it is *studied*. He gives much pains in his youth to the study of the languages of ancient Greece or Rome, or of modern Germany and

France, and he finds too frequently, after long courses of serious effort, that his knowledge of them is very imperfect.

But it never appears to strike him as equally necessary, if he is to understand the language of the lower animals, that he must give a corresponding attention to its study. Even in our universities, or wherever—as in Germany—it is scientifically taught or studied, *comparative philology* includes only the spoken, written, and printed languages of *man*.

The very name *philology* is literally a fondness for *words*—mere words—that is, for one form merely of the expression of feeling or thought. *Comparative language*, however, should obviously include *all* forms of expression, not those only that are *vocal* or that are represented by words. A chair or professorship of comparative language should exist in all our great universities, and due attention should be given to those rudimentary forms of expression that are common to other animals with man, and that are much more practically important than that limited form of language which is spoken, written, or printed.

As has been pointed out in the preceding chapter, even in man himself the latter form or forms of language do not always occur, while in such birds as the parrot very distinct *speech* and very appropriate remarks are occasionally exhibited or made. In a succeeding chapter it is shown that by mutual understanding of each other's language *conversation* becomes possible between man and his dog.

Man soon learns to understand the meaning or significance of the feature-changes, of the gestures, attitudes, or movements, of the vocal utterances, of other animals when it becomes his interest to do so—when, in order to their training, for instance, for this or that purpose of his own, he has to interpret their thoughts and feelings, gauge their tempers and temperament, form an estimate of their character or capabilities, ascertain the kind and amount of their intelligence. And similarly the dog, elephant, horse, and other animals, when a sufficient motive arises, and they have the necessary opportunity, speedily *learn man's language*—not the meaning of his looks and acts merely, but frequently of his words, phrases, and conversation.

Dog language is quite a study of itself, including the separate study of the—

1. Language of the voice—bark, howl, whine, snarl, growl.
2. Language of the eye and look.
3. Language of the tail and ear.
4. Language of the general attitude—movement, aspect, or gesture.

Bird language—the language of song in birds—is another study by itself, and attention may well be separately given to the different modes of expression in particular groups, such as poultry, cage birds, and parrots. *Ant* language, again, is equally peculiar and interesting.

Nay, the different *intonations* of a single sound may prove quite a study of itself—for instance, the bark or howl of the dog, the mewing or caterwauling of the cat.

The *diversity* of language, or its forms, even in a single family, is sometimes very marked, as much so as it is in the various races of mankind. Thus among ants inhabiting a given locality there may be said to be different peoples, using a different language and occupying different ant-hills or nests, each people or tribe being as much distinguished by its language as by its territory or district (Houzeau).

The recent experiments of Professor Ferrier, according to his own interpretation of the phenomena, tend to show that human and animal language are identical—that the barking of the dog and mewing of the cat are the *equivalents of speech* in man, and that the faculty of language in man and other animals has virtually the same seat in the brain. He describes opening the mouth, putting out the tongue, and barking in the dog, mewing and spitting or hissing in the cat, as 'signs corresponding to speech.' But it needed not the experiment of the physiologist or the pathologist, or the research of the anatomist, to tell us that the dog's bark, the cat's mew, and the horse's neigh, as well as corresponding vocal expressions in other animals, are the analogues of speech or speaking in man.

Language in animals—whatever be its nature—is both (*a*) *natural* and (*b*) *acquired*. In the latter case it may be

the result of (*a*) self-tuition or of (*b*) man's instruction or training. In both cases its *variety* is to be remarked upon, and, just as in man, this variety—which involves expressiveness or the range thereof—is frequently, if not always, in proportion to the degree of cultivation or *education* of the faculty.

The *interpretation* of animal language, in its varied forms, is of the utmost importance in relation to the discrimination of *motive*. It is, however, beset with difficulties, which arise mainly from the following causes or sources:—

1. The significance of animal language has been little *studied* by man.

2. The same feelings or thoughts are expressed in an infinite *variety of ways*, not only—

a. In different tribes, genera, or species, but—

b. In different individuals of the same species—different members of the same family—different offspring of the same parents.

c. In different sexes of the same species.

d. In the same individual at the same time, as well as at different ages or times, or under different circumstances.

3. The same outward expression may arise from or indicate very different mental states.

4. Other animals than man—in proportion to their difference in structure and habits—do not necessarily express the *same mental states in the same way*.

5. Even in man there are differences in the *modes of expression* of the same feelings or thoughts: e.g.—

a. In the infant and the adult.

b. In the philosopher and the savage.

c. In health and disease.

6. In other animals, as in man, there is a wonderful power of *repression* or inhibition of natural expression; so that real feelings and thoughts are successfully concealed.

7. There is, further, a power of *assumption* of expressions that are intended to deceive man or other animals as to the real mental condition.

8. One feeling frequently expresses itself by, or leads to,

the instant *development of another*, each having its suitable and intelligible mode of outward manifestation.

9. *New* expressions or modes thereof arise under new conditions or circumstances.

It is desirable to illustrate certain of these propositions in order to show the nature of the difficulties that will constantly occur to the student in the *interpretation* of animal language.

There are, in the first place, then, certain peculiarities in the mode of expressing the same feelings, wants, ideas, in different animals. In other words, there is a *difference in the mode of expression*—for instance, of an emotion—according to the kind of animal; there is a natural aptitude for a particular mode of expression in each species and genus; there is even, in a sense, a different language for each great group of animals (Houzeau).

Thus, while the dog barks, bites, growls, howls, whines, sniffs, and snarls, the horse neighs, kicks, stamps, paws, snorts, champs, and lashes its tail; the cat purrs, scratches, hisses, mews; cattle low, butt, gore, bellow; the elephant trumpets, roars, screams; the sheep and goat bleat; the ass brays; the cock crows, and the hen clucks and cackles.

Not only, however, are there different forms of language in different genera and species of animals, but different *dialects* in the same family. Thus we are told that each caste or clan of ants has its own language (Houzeau).

But, as a *per contra* to these peculiarities of species or genera, the *same physical expression* is frequently common to many species or genera, though it may not necessarily or always have the same significance. For instance, biting, or what is equivalent thereto—snapping with beak or bill—is common to the dog, horse, ass, wolf, and many birds; howling is common to the dog and certain monkeys; kicking to the horse, with many other animals; tail-lashing to the horse, mule, ass, and lion; butting to sheep and goats, with the ox; baying to the dog and wolf.

Expression may be given to a great variety of feelings or ideas by the same physical phenomenon. In other words, the *same action* or kind of action may result from very different

causes—may have the most different significance. The most opposite passions or emotions—such as joy and grief, pleasure and anger—may produce the same or a similar result (Reynolds, Darwin).

The orang expresses anger, joy, and peevishness by *stamping* (Cassell). The hen's well-known cluck may signify either (*a*) food discovery, or (*b*) satisfaction at the delivery of an egg, or (*c*) maternal pride at seeing her brood around her (Darwin).

The camel expresses, by the same sound, likes and dislikes, pleasure and annoyance (Drake). Elevation or depression of head-crests, wattles, or ruffs occurs equally from fear, surprise, and curiosity. Elevation or depression of the crest in the cockatoo may arise from agitation, surprise, curiosity, fear (Baird). Fondling or caressing of the young by mothers is the result of love, grief, or regret. Expressions that in the monkey denote pleasure, in the dog may proceed from anger, irritation, or displeasure (Darwin).

The *howl* of the dog may proceed from (*a*) bodily pain; (*b*) loss of way or master; (*c*) any kind of disappointment; (*d*) grief, anger, despair, or even mere impatience; or (*e*) a disagreeable or agreeable note in music striking on its sensitive ear. *Wailing* may arise from bodily pain, grief, expostulation, protest, or refusal.

The mewing of the cat may express anguish, sadness, melancholy—the result of ungratified love (Pierquin)—or it may be a mere signal of demand or petition—its form of making request—for instance, to be admitted to, or allowed exit from, some given room. *Moaning* may be a sign equally of grief, of mental pain, or of that which is purely physical (Cobbe). The *snort* of the horse may express fear or aversion, or both. The snorting of the musk ox 'is a sign either of fear or anger,' says Captain Koldeway.

The screams of crows may denote joy, fun, or mischief. The bleat of the sheep and lamb may arise from petition for aid, enquiry as to the place of a missing mother or offspring, intimation of danger or of accident, maternal gratitude or affection (Watson). The grin of the ape may indicate either anger or fun (Wallace). Flight may be the result of defeat,

cowardice, unequal strength in combatants, confession of weakness or desire for safety, sense of guilt and shame, or fear.

It is not surprising, then, that it should frequently be *difficult* or impossible for man to be sure that his *interpretation* or construction of the conduct or look of this or that animal is the correct one; and that there should arise even among those who have studied animal language, including eminent authors, irreconcilable *differences of opinion* as to the meaning to be attached to given sounds, attitudes, or actions.

A familiar instance or illustration of such difficulties and differences is to be found in the case of the beautiful peacock, which is so usually regarded as an emblem of man's *self-conceit*, self-love, vanity, or pride. Its dignified, strutting gait; its slow, deliberate movements; its expanded tail—may signify or arise from the feelings in question. There may be pride in the possession of its personal adornments; a consciousness of their power to fascinate; a knowledge of the means of displaying them to the greatest advantage.

The turkey cock is another unfortunate bird, whose strut and gobble have led it to be considered an emblem of human *consequentiality*, as it is so often manifested in civic Bumbledom. There is, however, as little *proof* of the existence of such a feeling of self-importance in the turkey as of personal vanity in the peacock. I do not say that, in either case, these emotions do not exist. All that I contend for is that there is nothing approaching the character of proof or demonstration either for or against the supposition of their existence, and that man, therefore, may either be right or wrong in his *interpretation* of the meaning or motive of the strut of the peacock or turkey cock.

White regards the parade walk of the Gallinaceæ as probably a mere peculiarity of gait, having even no sexual significance. The 'swagger' of the crow or daw, like the strut of the peacock, may be a mere habit of body, unassociated with any feeling akin to what we call pride or vanity (White). In other words, 'showing off' personal

attractions by the erection of hoods, the expansion of tails, or other means does not necessarily indicate, as is too generally supposed, self-conceit or personal pride; nor, indeed, is such erection or expansion necessarily in man's sense of the term a 'showing off.' Gould suggests, on the other hand, that the *shyness* of male birds may arise from a consciousness that their beauty is a source of danger to themselves. But it has to be proved that, as a rule, male birds are shy, and in proportion to their beauty; while it has to be determined that no other more probable explanation of these facts, if proved, is open to us.

Dujardin and Lubbock suggest other *interpretations* of the facts observed and described by Gélien as to bees than those which occurred to that naturalist himself. Thus bees have been described as licking each other; and this has been ascribed to their mutual or fraternal affection. Lubbock admits the fact of the licking, but points out that only those bees covered with honey are so licked; and hence his inference, which is at least legitimate, if it be not also the real explanation of the fact: 'I am satisfied that this is for the sake of the honey rather than of the bee.'

What has been supposed to be excessive *caution* in the parrot may really be mere physical awkwardness or slowness of motion (White).

Many animals possess and exercise the same power that man has of controlling or *repressing* their feelings—for instance, of bodily pain—when a sufficient *motive* for doing so exists. This power of self-control—of stifling emotion, of inhibiting or preventing all outward expression of the fear or other poignant feelings which nevertheless exist—is illustrated in many common feints, the object of which is to escape danger or death, in many dogs, birds, and beetles. Nor is it always or ever easy, especially for a novice, or for any man unacquainted with the mental character or physical peculiarities of a species—with the individuality of some of its members—to discriminate between the real or natural and the false or *feigned expression* even of feature.

For certain dogs at least can assume—as man so constantly does—'company manners'—a behaviour in the

society or presence of man, or of particular men—that do not represent their true feelings or thoughts, but are the result of *conventionality* and constraint. It is quite common, again, for the guilty but quick-witted dog to assume the aspect of ignorance or innocence, and it may require long and close watching to detect—and only when it believes itself unwatched by man—the little signs by which it betrays itself—the furtive look, the slinking gait, the avoidance of man.

And there are other animals quite as capable as man is of assuming, for the purposes of deceit, such looks or mien as will serve to throw man himself, or their animal enemies or prey, off their guard.

While, as a rule, and especially in young animals, there is an obvious outward demonstration or demonstrativeness of feeling; and while also there are cases—mostly in mature and experienced animals—in which there is, for some specific purpose, a successful repression of emotion, there are certain other cases in which there is simply, for various reasons, a *non-expression* of wants, desires, or ideas. Such animals do not give natural vent to their feelings; they are not naturally demonstrative; they are what in man would be called cold and self-contained, stolid, indifferent, impassive. This condition, however, when it exists, is generally the fruit of mental defect or disorder; in other words, it is morbid in its character.

Such animals find their human analogues in many savage races, and in many individuals among civilised peoples.

Thus Wallace says, 'In character the Malay is impassive. . . . He is not demonstrative. His feelings of surprise, admiration, or fear are never openly manifested, and are probably not strongly felt.'

Among the most interesting features of animal language are the fact that and the means by which such animals as the dog make themselves intelligible to man—for instance, by—

1. Attracting his attention to themselves, their young, or other animals; to things, persons, places, or events.

2. Making *reports* to him of the occurrence of events, involving the communication of information or intelligence.

3. Issuing *invitations* to him to go to a given place.

4. Preferring *requests* to him to do some desired thing.

That all this is frequently done is illustrated by the dog's behaviour when its master is murdered or meets with some accident. It not only instantly communicates intelligence of the event in the proper quarter, but it solicits immediate aid—spares no effort in obtaining it, and will take no denial. It does all this *inter alia* by the—

1. Anxiety, earnestness, or seriousness, not only of its look, but of its whole demeanour.

2. Persistency or pertinacity of its barking or whining, as well as its unusual character or its occurrence at unusual times and in unusual places.

3. Unusual character of its other voice-sounds, such as moans.

4. Restlessless or eccentricity of its movements, unusual excitement, agitation, or action, including incessant and wild leaping or running round or about a room or place, or round a person—apparently without immediate aim, but obviously not in or from joy.

5. Catching the dress of a master or mistress, and peremptorily dragging, pulling, or tugging him or her in a particular direction thereby.

6. Scampering off in a fixed direction when it finds itself likely to be followed by those whose aid it has solicited.

7. Going in front when it finds itself so followed—leading or *showing the way* to a given locality.

8. Looking behind, however, now and again, to make sure that it is being duly followed, and by the proper parties.

9. Stopping at a given spot, and pointing, scratching, tearing, or barking, as circumstances may require.

10. Frequency of visits—unaccompanied—to the same spot.

By some such means—by an intelligent dog—many a murder has been discovered, many a tipsy or wounded master rescued, many lost articles recovered. Again, a dog guarding a sleeping child summons the absent nurse, on the infant's awaking, by searching for and discovering her in some other apartment, pulling at her dress, and so drawing her towards the nursery—all just as a child itself would do under similar circumstances.

CHAPTER XIII.

VOCAL LANGUAGE.

THE principal *forms of vocal* language among the lower animals—the chief voice-sounds by which they exhibit or give expression to their various feelings or emotions, ideas or thoughts, wants or wishes—are the following:—

1. *Articulate speech*, consisting mainly of successful imitation of man's *words* and *phrases*—for instance, in the parrot, parroquet, starling, jackdaw, grakle, raven, crow, jay, magpie, and blackbird.

This subject includes—

a. The *distinct utterance* of words and phrases, so as to deceive man himself, as well as certain other animals that are accustomed to, and that understand, man's words and phrases—e.g. the dog and the horse.

b. The *repetition of words* and sentences, without necessarily knowing their meaning—otherwise mere mechanical repetition—by rote, including recitation, quotation, declamation, and song-singing.

c. The *appropriate use of words and sentences*, involving the power of composition and the association of ideas with words, including the association of the same kind of ideas that man attaches to the same kind of words and phrases.

Illustrations are to be found in the form of—

1. Pertinent remark or comment.
2. Question and reply.
3. The expression of physical wants.
4. Salutation or address, including the use of the proper names of persons.
5. Giving orders.

6. Correction of error.
7. Satire.
8. Rebuke.
9. Use of oaths or vituperation.

d. The consequent power of *conversation with man.*

e. The acquisition and use of various of the *languages of man*, including, unfortunately, slang and oaths in more than one European language.

2. *Inarticulate cries* of different kinds, comparable to the interjectional exclamations of man, commonest in young animals of the most diverse genera and species, such as the dog, elephant, camel, seal, bear, mule, ox, hyæna, red squirrel, hedgehog, capybara, gorilla, siamang, orang, chimpanzee and certain apes and monkeys, swan, parrot, woodpecker, waterfowl, common fowl, owl, rook, turkey, swallow, and other birds.

This category may be held to include—

a. Screams—for instance, in animals so different as the dog, camel, elephant, orang and certain monkeys, goose, flamingo, fish hawk, North American kingfisher, swallow, hen turkey, crow, and other birds.

b. Shrieks—in the dog, some apes, and swallow.

c. Yells—in the soko, dog, and pig.

d. Moans or groans, shouts, and many other voice-sounds that need not here be specified.

The *cries* of animals are of special interest in at least two respects, viz.—

1. Their frequently *human*-childlike or infantile character; and—

2. The fact that they constitute one of the main primary elements out of which all human-spoken language has grown or been constructed (Blackie).

The war-cry of the gorilla is said to be humanlike in its tone or general character, resembling that of savage man (Houzeau). The bear whelp cries like a child when hungry. The wail of the motherless 'cat' (or babe) seal is 'very like that of a human infant.' It is described as 'crying piteously' for its slaughtered mother (Buckland). Mary Howitt describes the cries of a woodpecker as resem-

bling those of a child. Milne Edwards points out that the cry of agony or distress occurs equally in the child and animal. The female jaco monkey cries when tired, just as the child does. The young siamang utters pettish cries and offers resistance while being washed by its mother, just as the human child does (Cassell). Apes have cries and the chimpanzee *shouts* of pleasure in their amusements.

Wallace says of a young female orang that unsavoury food caused it 'to *scream* and to stamp with its feet, just like a child in a passion. It was its usual tactic to scream if it thought itself neglected and wished to attract attention .... gradually ceasing to scream when no notice was taken; but it immediately began again if it heard anyone's footstep.' Of another orang—a male—Dr. Yvan tells us that 'his master having taken away from him a mango fruit, he set up a peevish howling, like a vexed child. As this was not successful, he threw himself flat on his belly, beat the ground with his fist, screamed, wept, and howled. . . . When at last the fruit was given back to him he threw it at his master's head.'

Of all the varied forms of vocal expression there is none of greater interest to the student of comparative psychology than that of *articulate speech*—the power of speaking or talking—possessed by such birds as the parrot.

That its enunciation of words and phrases picked up by imitation from man, either spontaneously or by means of his efforts at the bird's linguistic education, is both *correct and clear* there can be no doubt. It is proved by the frequency with which man allows himself to be misled by the talk of the parrot, fancying he is listening to some fellow-man, and by the perhaps even greater frequency with which such animals as the dog and horse, accustomed to obey man's words and sentences of command, commit the error of obeying instead the waggish, counterfeit orders of a parrot. Of the Truefitt parrot, and its mimicry or imitation of the manner of and the words and phrases of command used by a volunteer drill sergeant, a captain of volunteers asserted that he had 'never heard a drill sergeant whose articulation was to be compared with that of the parrot.' Nor is this

distinctness of utterance confined to the parrot. We are told, for instance, of a jackdaw, at one of the Crystal Palace bird shows in 1875, that it could speak '141 words as plain as any human being' ('Animal World'). These correct repetitions of man's words, when combined in sentences, sometimes of considerable length, include—

1. The *recitation* of—

a. Quotations from Shakespeare or other dramatists or poets.

b. Creeds or portions of Church services.

2. The *giving* of *orders* or commands.

3. The use of *oaths* in vituperation.

The parrot may do all this and a great deal more without necessarily knowing the *meaning* of what it says—it may associate no ideas with the words or verbal sounds to which it gives such glib utterance.

It is too common an error of man's, however, to regard the parrot as learning to articulate or utter and to repeat words only by rote, without attaching any ideas to them—as school children, in point of fact, so much more frequently do. It is a libel on the intelligence of the parrot to talk of such school children repeating their catechism, for instance, 'like a parrot,' as synonymous with 'by rote.'

That in children such an effort is mainly mechanical is more than probable. No doubt the same may be the case in some parrots, but it is certainly not true of all, and probably not of many of them. Abundant evidence has been adduced to show that many so-called *talking* parrots (which are generally the common grey parrot, the most intelligent, though not the most showy, of its race) attach man's ideas to man's words—learn their *meaning*, apply them properly, not singly only, but in various combinations—in other words, *speak sense and talk to the purpose.*

Endless stories have been told me, orally and by eye-witnesses, of the *pertinence of remark* involved in the talking feats of favourite parrots—remarks of such a kind as sometimes shamed, sometimes astonished, their too indulgent and too careless masters or mistresses. And I have met with many incidents of a similar kind recorded in print. One or

two illustrative parrot biographies are all, however, that need here be referred to.

One of the best and most recent narratives—showing the wonderful power of *appropriate remark* in the grey parrot—was given in 'Chambers's Journal' in 1874, the animal described belonging to a well-known photographer (Truefitt) in that beautiful promenade of Edinburgh—Princes Street. The bird was 'interviewed' by a clergyman specially in order to the publication of the results of his enquiry. To satisfy myself of the perfect accuracy of the description given by the journalist, of the authenticity of all the facts narrated, I visited the parrot in the summer of 1875. It was then at summer quarters with its master at Cramond, near Edinburgh. In addition to witnessing—at great disadvantage, however—many of the animal's speaking performances, I had full conversations with both its master and mistress; and the result is that I can substantially confirm the statements of the reverend essayist who first brought its remarkable linguistic attainments under public notice.

Of this Truefitt parrot the following anecdotes are told:—Roused from sleep by the one o'clock time-gun fired from Edinburgh Castle, he would exclaim, 'One o'clock! one o'clock! Polly wants his dinner, Jeanie!' addressing the housemaid. 'Lay the cloth'—the tablecloth—repeating this cry till the cloth was laid and the dinner duly set out. He would originate, interrupt, and take part in man's *conversation*, some of his observations being 'quiet, grave, solemn, but intensely satirical,' throwing in now and then a little French or slang. He administered rebuke in very sharp tones, that could not be misunderstood. He invited himself to sing; then, 'coughing like a nervous young lady about to entertain a party,' he sang verse after verse of different songs, each to its appropriate tune, making himself the hero by ingeniously substituting in the proper places his own name. He *called* his master, but *ordered* the servant, obviously recognising the difference in social status, made enquiries and uttered exclamations, cajoled, scolded, and hurrahed, all in such a way as to lead his interviewer to remark, 'What surprised me most was the appropriateness of the bird's words to the

circumstances.' And after any of his exhibitions he indulged in self-gratulation, 'as if aware that he had shown himself off to some advantage.'

Again, the *parroquet* whose talents are so lovingly and admiringly described by Lady Clementina Davies made sensible, well-timed comments—for instance, on its food. Not only did it possess the gift of speech, but it had the additional accomplishment of knowing *more than one spoken language of man.* It swore when enraged, and it could venture to abuse both in French and English those who affronted it.

And, what is even more interesting and less objectionable, after recovering from an illness its talk became excited and *incoherent*—a circumstance having a most important bearing on delusion, delirium, and mania in the lower animals. Pierquin long ago pointed out a correlative fact—that not only do certain birds acquire a certain power or knowledge of *human language*, but that the *loss* of such acquired language accompanies disuse or want of practice, as well as bodily or mental disorder, just as in man.

A knowledge of *foreign languages*, though commonest in, is not restricted to, the parrot; for a Senegal jackdaw, at one of the Crystal Palace bird shows in 1875, 'not only spoke English but French too' ('Animal World').

Professor Low describes a parrot belonging to a hostelry as calling for the waiter or hostler, according to the character of the arrivals at the inn—on foot or on horseback, in carriages or in carts.

The parrot, unfortunately, does not always display its power of speech for *good* purposes, for among the ends which this accomplishment is occasionally made to subserve are mendacity, deception, jeering, swearing, mischief, and practical joking (Jesse). It picks up man's *oaths* with as great readiness as his pious ejaculations, and uses them with all man's emphasis and theatrical effect.

Starlings and ravens have also been described as using man's words with a consciousness of their purport, and this even without man's teaching—by spontaneous imitation, observation, reflection (Büchner).

But speech, like song, is more frequently the result of tuition by man and of incessant practice in lesson-learning.

According to Houzeau, however, *articulate sounds* are not confined to the *Psittacidæ* or to birds, but occur in certain other animals—for instance, in the siamang and the gorilla.

Certain 'learned' *dogs* have been taught a kind of speech (Leibnitz)—to use certain words so as to express certain wants (Watson), so as at least to be able to order or call for certain articles. But this sort of speaking, when it does not consist of mere differentiated tones of the bark, falls very far short of the true speech of the parrot, both as regards the distinctness of the utterance and the knowledge of the meaning of words and their appropriate applications.

Certain other learned dogs, while they cannot in any way speak or utter words, can yet compose words, possessing as they do a certain knowledge of man's *alphabet* and of the practice, if not some of the principles, of applying it in composition (Watson). They recognise certain at least of his printed letters and words, and they can select and arrange the former so as to constitute the latter—that is to say, to a certain limited extent they can *compose words*.

It is, then, quite legitimate to speak of the *loquacity*, garrulity, prattle, or talk of certain parrots, and probably also of certain other birds, such as the starling, raven, and jackdaw. In other cases, however, what is called *speech* in birds may be mere sounds, resembling, or supposed to resemble, man's words or phrases; what is magniloquently described by itinerant showmen as *talking* in fish—which are really seals—is merely the emission of a kind of cry, resembling some such word or sound as 'Ma-ma.'

There is, for instance, a so-called 'speaking bird' in Guiana (Waterton), and the 'talking crow' of Jamaica (Watson), with the exact nature of whose speech I am unacquainted. The forms of indistinct utterance that constitute *spurious speech* include the chatter, jabber, or palaver of monkeys and apes, of sparrows and swallows, of the merlo and goose, of the hyæna and peccary, and much, no doubt, of the so-called talk even of the starling.

Those who have studied *bird song* have pointed out the

interesting fact that the song of the nightingale and of other singing birds is capable of reduction to and interpretation by words. It may be translated into man's *written* words, and it is therefore in a sense quite proper to speak of the *articulation* of bird song.

Not a few authors have directed attention to the fact that many of the modes of expression employed by the lower animals are to be regarded as the *equivalents of speech* in man. Thus in this sense certain animals have been said, with perfect propriety, to possess *watchwords*—that is, sounds or signs that are analogous in their uses to watchwords. Others are said to *speak* to or *converse* with each other—to *tell* or *ask* news, to *address* or *harangue* assemblies, to *call* one another or man.

Barking in the dog is the physiological *equivalent of speech* in man, according to Ferrier. Sparrows and other birds may be said to *tell* each other, for instance, where food-supply is forthcoming. They communicate information —facts—to each other quite as effectually as if they had done so by words or sentences. The dog can *tell* itself, in its own way, whether its master is in good or bad humour.

Certain observations of Gélien on bees led him to conclude that in each hive they have some common sign, of which he speaks as a *pass-word*. And this conclusion seems to have been adopted by subsequent writers, such as Burmeister, who says that the use of such a sign or *word* 'serves to prevent any strange bee from intruding into the hive without being immediately detected and killed' (Lubbock). Amatory *converse* may be very real, though not necessarily by sounds at all. *Palpation* by the antennæ in the ant takes the place of man's speech and writing or printing. The dog may truly be said to possess 'speaking eyes' (Cobbe), or to *speak* with its *eyes*. During the siege of Paris by the Prussians in 1870–1 the street dogs are said to have held *deliberative assemblies*, in which they *spoke* by their looks or features and tails, as well as by their throats, mouths and lips (barks and mutterings). Messengers appeared to bring *news*, and the assembly made *comments* thereon (Gautier).

CHAPTER XIV.

NON-VOCAL LANGUAGE.

THE principal forms of non-vocal language—the chief modes of expression of thought or feeling, other than those which consist in the emission of sounds of various kinds—are the following:—

1. *Actions*—movement or motion—including gesture and gesticulation, attitude and posture, gait, carriage, mien, manner, deportment or demeanour, conduct or behaviour.

a. General, involving the whole or greater part of the body: e.g.—

1. *Capers* or antics, gambols, frolic, frisking.
   E.g. in young animals generally, such as the lamb, puppy, and kitten; but also in many adult birds in the season of love; in the adult rabbit and dog, ape and chimpanzee.
2. *Skipping*, leaping or jumping, bounding, scampering, racing or running, coursing, charging or careering.
   E.g. in the dog, horse, and cattle.
3. *Dancing*, hopping, prancing, plunging, flinging, rearing.
   E.g. in the horse, hare, mongoose, certain monkeys, dog, and goat.
4. *Prostration*, crouching, grovelling, cowering, crawling, cringing, fawning.
   E.g. in the dog, cat, and mouse.
5. Self-concealment or *hiding*, flight, sneaking, skulking, slinking, shirking, or shrinking.
   E.g. in the dog, cat, and orang.

6. *Writhing* or wriggling.
   E.g. from pain.
7. *Rubbing* body against the bodies of other animals or against hard inert substances.
   E.g. in the elephant, horse, dog, cat, cattle, sheep, ape, and parrot.
8. *Strutting*, including swaggering.
   E.g. in the turkey and peacock, Cupid and Argus pheasants, and gander.
9. *Immobility*, from refusal or inability to move.
   E.g. in the horse and ass.
10. *Gyration*—whirling round and round in a circle.
    E.g. in the dog and horse.
11. *Tumbling*, revolution, rolling over and over in the air or on the ground.
    E.g. in certain pigeons (such as the tumbler), certain dogs, and the orang.
12. Salaaming and *bowing*.
    E.g. in elephants and certain monkeys.
13. *General restlessness*, muscular and nervous.

b. Special—of particular parts or members of the body.

1. *Mouth*, lips, teeth, and tongue, beaks or bills.
   a. Biting, including worrying, tearing, gnawing, gnashing.
      E.g. in the dog, horse, camel, guanaco, monkey, ass, suricate, and Magellan fox.
   b. Snapping.
      E.g. in the dog, horse, wolf, dove, and other birds.
   c. Spitting.
      E.g. in the camel, vicuna, guanaco, cat, certain monkeys, and scorpions.
   d. Licking.
      E.g. in the dog, cat, wolf, pig, rabbit, Guinea-pig, and certain bees.
   e. Pouting.
      E.g. in certain apes and monkeys.
2. *Legs and arms*, paws, heels, hoofs, claws.

a. *Touching* or tapping—

1. With paws.

E.g. in the cat.

2. With antennæ or pincers.

E.g. in ants, common and white.

b. *Embrace*, caress, fondling, hugging.

E.g. in the siamang, orang, lori, certain apes, dog, and elephant.

c. *Striking* blows, beating, pushing, jogging.

E.g. in the horse, orang, capybara.

d. *Scratching.*

E.g. in the cat and dog.

e. *Kicking* and *pawing.*

E.g. in the horse and ass.

f. *Hand*-wringing, squeezing, or shaking.

E.g. in the lori, certain monkeys, and anthropoid apes.

3. *Head* and its appendages, including *horns.*

a. *Butting* and *goring.*

E.g. in cattle, deer, sheep, goats, capybara.

b. *Head*-shaking, tossing, rubbing.

E.g. in certain apes, bull, horse, dog, and cat.

4. *Nose* and nostrils.

a. *Sniffing.*

E.g. in the dog, horse, and various other Ruminants.

b. *Nose-rubbing.*

E.g. in the horse.

5. *Ear* movements, including erection, depression, and retraction.

E.g. in the dog and horse.

6. *Wing* movements, including expansion, flapping, and fluttering.

E.g. in birds.

7. *Tail* movements, including erection, expansion, vibration (wagging and lashing).

E.g. in the wolf, goat, ram, stag, lion,

dog, cat, horse, ox, and other Ruminants; sparrows and various other birds.

2. *Erection*, inflation, expansion, or elevation, with their opposite condition of *depression*, of various dermal appendages, including especially—

a. Hair, bristles, and quills.

E.g. in the lion, hog or boar, dog and cat, certain caterpillars, porcupine, and hedgehog.

b. Feathers, including ruffs.

E.g. in ruffling or other displays of plumage in birds.

c. Spurs, combs, wattles, crests, hoods, frills of the head, neck, or throat.

E.g. in the cockatoo, frill lizard, bladdernose seal, rook.

d. Head, neck, throat, or breast puffing, swelling dilatation, or distension.

E.g. in certain serpents and lizards, such as the Egyptian cobra and the anobis, the pouter and other pigeons.

3. *Coloration* and decoloration of the skin of the face or throat, or their appendages—such as wattles, combs, feathers, bristles, or hair—including—

a. Hyperæmia—increase of blood-colour by congestion or determination of blood, leading to flushing, blushing, and reddening.

E.g. in the mandrill and other baboons, dog, turkey cock (wattle).

b. Anæmia—decrease of blood-colour from sudden local removal of blood-supply, leading to pallor or colour-loss.

E.g. in the stickleback.

c. Other *colour-change.*

E.g. in the chameleon, anobis, and other lizards.

4. Cutaneous or other *exudations*, such as sweat, including the emission of coloured *fluids.*

5. Emission of *smells* or odours, mostly pungent and disagreeable.

6. Emission of *light*, including so-called 'phosphorescence.'

E.g. in the glowworm.

7. *Physiognomy*—facial expression, the play of feature, peculiarities of countenance—including especially the look, stare, or gaze of the eye, constituting what has been called *eye language*; and also including—

a. Grimace.

E.g. in apes and baboons.

b. Vacancy of feature, usually indicative of disease.

Of all the non-vocal forms of animal language the most important to the student of comparative psychology is probably the last. But there are great difficulties in the study of *feature-changes* in the lower animals, and in their comparison with those occurring in man, the principal being the fact that the face in other animals is so frequently covered with hair, feathers, or other cutaneous adjuncts or appendages, that prevent our seeing the play of the facial muscles. The *physiognomy* of the lower animals can, therefore, be best or only studied in those that are *bare-faced*, the number of whom is extremely limited. There are, however, a few literally or comparatively bare-faced monkeys, apes, or baboons—such as the mandrill—dogs, and other animals, in which even the phenomenon of *blushing*, or flushing of the skin, and its converse can be observed.

Two points are especially noteworthy in our consideration of facial expression in the lower animals—

1. Its *eloquence*—the number of mental states of which it is the correlative—and—

2. Its wonderful *variety* or variability, not only in different genera and species, or in different individuals of the same species, but even in the same individual at different times or under different circumstances.

In the dog and horse especially the whole phenomena of feature-change—of the varying states of the countenance—in particular of the look and eye—as the signs of feeling may be studied with equal advantage and interest. The

physiognomy of the dog and certain of the Quadrumana in many respects resembles that of man. The beggar's dog returns thanks partly at least by its *look* (Murray). It has looks of enquiry as to the meaning of unfamiliar ceremonies or events, as to the nature or character of unknown things or persons. It throws pathos or plaintiveness into its look as much as into its howl. It has an abashed or apologetic look when, knowing it to be a fault, it soils a drawing-room carpet with its muddy feet (Houzeau). Its look—as well as the movements of the head or tail, or body as a whole, including its gait—convey the expression of pride or exultation at success, business importance, and many other feelings or mental states (Watson). Its look of friendly recognition is frequently equivalent to man's bow or nod to fellow-man. Houzeau speaks of its look of interrogation in difficulty and of the expressiveness of its mere glance. Dogs

> Woo kind words by look,

says Southey.

Darwin refers to sporting dogs *looking* or waiting for further *instructions* from their masters when in *doubt*. A dog's look of shame when caught in a fault is notorious ('Animal World'). The eloquence both of its look and *mien* has been pointed out by Grenville Murray, who also describes its wistful, sad, or sorrowful looks and longings—its looks of gentleness, timidity, gratitude, eagerness of desire to please, or happiness.

The *physiognomy* of the lower animals—facial and general—has successfully engaged the talents of many gifted *artists*, such as the late Sir Edwin Landseer, and the living Rosa Bonheur, Joseph Wolf, and Harrison Weir; and it is one of the best possible proofs, on the one hand, of the reality of the close connection between mental states and facial or other forms of expression in other animals as in man, and, on the other, of the fidelity to nature of the painter's art, that he can depict on canvas the mental character of such animals as the dog, horse, ass, or monkey, which may sometimes be said in a sense to 'speak' from the painter's canvas. The attention of artists, however, has been attracted to what

may be fitly called the physiognomy of *health*; but another chapter shows that there exists among the lower animals, as in man, a less familiar, but not less eloquent or important, physiognomy of *disease*.

Unfortunately some of the lower animals have *imitated from man* certain of his most objectionable modes of expression—intimating their derision, for instance, as the masked callithrix (monkey) does, by putting its thumb to its nose (Cassell).

One of the most interesting forms of non-vocal language is that of *touch*, especially as it occurs among ants. By *strokes* of their *antennæ* they intimate the presence of booty or of palatable food, point out suitable prey and the best places for foraging. Their antennæ give them the means of intercommunication of ideas—of holding conversation with each other—of sending requests for aid (Houzeau, Watson, Smith). This exchange of thought or feeling includes the conveyance of intelligence or news—for instance, of discoveries. One animal can show the way to others. Mutual greetings and recognition take place after long separation (Franklin, Kirby and Spence). By such means they issue orders and invitations, and give advice (Figuier). Communication of ideas by means of antennæ, or analogous organs, occurs also among bees, and probably many other insects. The soldiers of the white ants signal to the workers by strokes of their pincers (Figuier). Thus we see that announcements of all kinds are *not necessarily vocal*.

Another of the most interesting forms of non-vocal language is the use made by certain 'learned' animals of *man's alphabet*—of letters—in the construction of words. Thus we are told that the performing dog Minos, 'by means of a double alphabet of separate letters, writes or constructs words.'

CHAPTER XV.

LAUGHTER AND WEEPING.

THERE are certain modes of expression of the feelings that deserve special consideration from their having hitherto been generally considered essentially or peculiarly human—as confined exclusively to *man*. Of these the most interesting and important is *laughter*.

But, in the first place, as regards man himself, it is not generally borne in mind that there are whole races who *do not laugh*, and that in those who do laughter is not necessarily or always associated with, nor does it proceed from, a perception of the absurd or ridiculous. The American Indians and the Cingalese Veddas are illustrations of races that do not laugh. And we know, on the other hand, as well as the poet, that there is the laugh

> That speaks the vacant mind—

that means nothing, that is utterly inane and apparently causeless—that characterises the human idiot, lunatic, or fool.

As regards the lower animals, it can be shown that certain of them possess, on the one hand—

1. The facial, vocal, or other *muscles*, including the diaphragm, that are concerned in the physical phenomenon of laughter in man; and, on the other—

2. The *emotions* or *ideas* which in man give rise to laughter.

It is obvious that if it could be shown that the lower animals are devoid of the muscles whose action creates the expression or phenomenon of laughter, what has been called

laughter in them would have to be relegated to some other category than human laughter. In studying this subject of the physical manifestations in other animals comparable to laughter in man, I applied in the first place to two experienced comparative anatomists, enquiring whether and how far the lower animals, or certain of them, possess the various *muscles* concerned in laughter—that is, physical apparatus for its exhibition.

These authorities were Professor Macalister, of the University of Dublin, and Professor Morrison Watson, of the Owens College, Manchester. The replies received from both left me in no doubt that various animals do possess such muscular apparatus, and that, so far as *it* is concerned, there is no reason why certain of them should not laugh as well as smile, grin, or grimace. Macalister, for instance, demonstrates the presence of the facial muscles of laughter in the gorilla, while Darwin had previously pointed out that various monkeys possess the same facial muscles which in man are engaged in laughter. It is well known that all the Mammalia, in common with man, have a diaphragm capable of rapid alternations of contraction and relaxation, as well as of spasmodic or convulsive action.

In other animals, as in man, the physical phenomena of laughter include—

1. Certain changes in facial expression.
2. Certain voice or other sounds; and—
3. Certain convulsive or other movements of the chest or other parts of the body.

Changes in facial expression, of a kind comparable with those that occur and are characteristic of laughter, are met with also—in smiles, grins, and grimaces—in certain animals. Some monkeys and apes—such as the chimpanzee—*smile* (Darwin, Pierquin). The smile of the titi is described as a 'playful' one (Cassell). Smiling in the dog has been represented as occurring from the very different feelings of hypocrisy and good-nature. *Grins and grimaces*, again, are common among monkeys and apes, but are described also as occurring in the dog under the influence of pleasure or affection (Darwin). That 'broad grin' which is usually

associated with, or arises from, a sense of *fun* is developed in the orang, according to Romanes, who also speaks of grinning in a Skye terrier of his own as 'intended to imitate laughter.' It was the result of 'evident purpose;' the dog 'wished to be particularly agreeable,' and he imitated man's laughter even to 'shaking his sides in a convulsive manner.'

The soko too grins (Livingstone); and so does the orang, which smiles also when tickled (Darwin and Watson).

Among voice-sounds comparable with laughter—arising from the same kind of feelings or ideas — are *chuckling*, giggling, and tittering, which have been described as occurring in certain animals. Thus chuckling, as a prelude to laughter, is producible in the chimpanzee by the action of *tickling* (Darwin). The parrot chuckles at the success of its own practical jokes (Darwin). Chuckling occurs also in certain monkeys. The soko *giggles* (Livingstone). *Tittering* occurs among monkeys when they are pleased (Darwin).

Various animals *imitate*, and successfully, *man's laughter* —that is, its outward expression. The parrot, for instance, can be taught to imitate its master's laughter, just as it learns to speak his verbal language and to pipe or whistle his tunes (Darwin). But the same animal is capable also of hearty and spontaneous laughter—of *fits* or peals of laughter. It laughs at its own mistakes or mischief (Watson) Sir Wyville Thomson describes the 'loud, mocking laugh' of a Brazilian one at the success of a practical joke of its own. A writer in 'Chambers's Journal' describes a well-known Edinburgh parrot as 'a capital laugher,' and as laughing 'heartily.' White speaks of heartiness of laughter in the woodpecker. A pet magpie of Jesse's had a laugh that was 'so hearty, joyous, and natural, that no one who heard it could help joining in it.' Wood tells us that certain swallows, on the successful issue of a practical joke played by them on a cat, seemed each 'to set up a laugh at the disappointed enemy, very like the laugh of a young child when tickled.'

Laughter has been frequently described as occurring in the Quadrumana—including the orang and chimpanzee —when tickled (Darwin, Watson, Le Cat, Grant), and

certain monkeys and apes when pleased (Buckland, Darwin, Pierquin). The laughter of certain apes is said to be analogous to man's own, in that it is noisy and expansive or hilarious. So close indeed is the resemblance or analogy that the grave Turks compare laughing Western Europeans to apes (Houzeau). A chimpanzee at the London Zoological Gardens can be made by his keeper to laugh when pleased or caressed ('Graphic').

It is obvious that in such cases laughter proceeds from, or is the expression of, a considerable variety of feelings, bodily as well as mental, for *tickling* seems as capable of producing certain kinds or equivalents of laughter in other animals as in man; while among mental states productive of it are to be mentioned—

1. A sense of fun or humour.
2. Perception of the absurd, ridiculous, ludicrous, odd, or droll.
3. Pleasure or satisfaction.
4. Exultation.
5. Derision.
6. Joy, especially when sudden and excessive.

It must here be remembered that laughter, though usually in man an expression of pleasure or of pleasurable emotions, is not so always or necessarily. When it is produced, for instance, by *tickling*, it is a purely reflex physical act, and, so far from being associated with pleasant feelings, there may be 'intense pain—so great, indeed, as to excite a sense of impending dissolution' (Burton). The same is probably the case in other animals; so that we ought to be careful in our *interpretation* of the nature and causes in them of laughter or laughter-like sounds.

Nor does tickling always produce the same kind of results in other animals as in man; for White tells us that this sort of touch begets 'franticness'—not laughter or anything resembling it—in the horse.

Not only, then, do certain animals laugh, but they are actuated by the ideas and emotions which in man give rise to laughter. In particular many of them have a keen sense of *fun* or humour, to which they give expression in a great

variety of ways. And not only do they enjoy and appreciate fun in each other, but they understand, appreciate, and enjoy that of man, distinguishing fun or joke from earnest, and the fun of good humour and good intent from that of ridicule or derision.

Writing to me in July 1871, the late Sir Henry Holland remarks, 'I especially allude to the sense of fun in the higher animals as a striking demonstration of the relation of their [mental] faculties to those of man.' In some of his published works he draws a distinction between wit and fun, ascribing a sense of fun to the monkey and the dog, but regarding wit as a characteristic of man alone. In order, however, to justify man's monopoly of *wit*, as contrasted with or separated from fun, it must obviously be redefined in some special way; for, according to the usual or dictionary definition of wit — 'the power of combining ideas with ludicrous effect'—there can be no doubt of its being an attribute of various quadrupeds and birds.

A sense of *fun* is exhibited in various ways by a considerable variety of animals, including especially, among the Mammalia, the monkey and the dog, and among birds the parrot, mocking-bird, and starling. They show it more particularly — both adult and young animals — in their own—

1. Practical jokes and—
2. Sports or games—

and in the part which these animals so frequently play in the jokes and sports of man. Miss Buist asserts that some of our other common cage birds, besides the parrot and starling, display what appears to be a sense of the humorous. The 'Animal World' tells us of a canary 'meaning fun.' The parrot obviously enjoys and appreciates fun; it exhibits merriment or mirth sometimes of a rollicking, boisterous, demonstrative kind (Broderip). White speaks of a pet rabbit making and enjoying fun with various playfellows. Fun in the mouse is displayed in its antics ('Animal World'). Fun occurs even in the bull (Buckland). Miss Cobbe says, 'The goose . . . . has perhaps the keenest appreciation of *humour* of any animal, unless it be her own arch-enemy the

fox.' And she illustrates this assertion by the narrative of a practical joke played on a number of pigs by a flock of geese. The poor porkers were caused to 'run the gauntlet' down a lane of geese biting at them with their bills, simply in order to frighten them and that the geese might enjoy the terror and squalling of the pigs. Wood mentions an Irish terrier that had a keen love of fun, 'and no one could have been more fertile in hitting upon plans for gratifying it.' The horse (Nichols), the hare ('Percy Anecdotes'), rooks (White), all engage in *frolic* of different kinds. All young animals occupy themselves largely in gambols, and all their various modes of self-amusement involve a certain amount of fun. The humorousness of their practical jokes has been specially noted in the Rhesus and Diana monkeys (Cassell).

These *practical jokes*, and consequently the humour involved, are sometimes of a grim or ghastly kind — for instance, in certain cases in which the perpetrator takes a cruel delight in the suffering or torture of its fellow. Such cruel fun is not confined by any means to monkeys (Buckland), but is to be met with also in the parrot. The dog, too, has certain modes of making or taking fun at the expense of suffering in other animals. For instance, it amuses itself not only by chasing sheep, but by worrying them or biting their forelegs or feet ('Animal World'). I had a terrier that proved a nuisance from its habit of seizing all barefooted beggars by the feet.

'One of my horses,' says Baker Pasha, 'out of pure *amusement*, kicks at the men as they pass, and having succeeded several times in kicking them into the river, he perseveres in the fun—I believe for lack of other employment.'

Certain animals, and especially certain dogs, understand or appreciate *man's fun*, entering into it thoroughly, co-operating with him in carrying it on or out. Thus a favourite terrier of Sir Edwin Landseer's 'readily learned his master's will, and equally understood his fun' (Macaulay and 'Animal World'). Dogs, and even cats, take part in the fun and frolic—sometimes rough or boisterous enough—of

their child playfellows. Thus a cat 'would allow itself to be rolled up or swung about in a tablecloth, never making any resistance, but purring and seeming to enjoy the fun' ('Animal World').

Moreover, some dogs distinguish the different kinds of man's laughter—that which is good-humoured or sympathetic from what is sarcastic. They know full well the difference between being laughed at and laughed with—being made the subject of derision and being the cause of harmless merriment. Their sensitiveness to anything like *ridicule* from man causes them to dislike, and probably to resent, all forms or degrees of being laughed at; they decline becoming the subjects of any sort of derisive laughter. They not unfrequently even try to *produce laughter in man*—that sort of laughter which betokens his being simply amused—and they are chagrined if their efforts fail. Thus Romanes tells us of a Skye terrier that endeavoured to amuse its master and provoke his laughter by performing certain tricks that it had taught itself, the dog becoming sulky if its efforts to please were not successful. An orang, too, in the London Zoological Gardens showed gratification at the human laughter excited by its practical jokes (Romanes). Wood mentions a tame jackdaw enjoying the fun of boys' games—leapfrog or races—as much apparently as the boys themselves did.

We have already seen how frequently, and in how many respects, the character of such an animal as the dog becomes a *reflex* of that of its master. A man brimful of good-natured fun—a human wag, fond of amusing practical jokes—naturally begets, by imitation and sympathy, what might be called a 'comical' dog—one ready not only to take part in its master's fun, but to indulge in fun on its own account (Cobbe).

It has been shown, then, that certain animals can, on the one hand, laugh, and on the other possess unmistakably a sense of *humour*; but it does not follow that the sense in question, and its expression in laughter, co-exist in the same animal—in the relation of cause and effect. Doubtless they do so sometimes, as in the case of the waggish, fun-loving

parrot. But, in the first place, there are in various animals laughterlike sounds—frequently or usually described as 'laughter'—that have no connection probably with a sense of fun; while, in the second, the sense in question, where it exists, is not necessarily, or even generally or frequently, manifested by laughter.

Nor does it follow that, in other animals any more than in man, laughter is to be considered an expression of fun or humour only. In such a bird as the parrot it may embody sarcasm or derision, defiance or insult, as well as fun. The grinning of certain monkeys and apes is also not necessarily or always associated with a sense of amusement; it may, and does, arise from other feelings or causes, as in man. A chuckle, too, may arise in the same animals from a simple feeling of satisfaction at success or good fortune.

Of mere laughterlike sounds the following are illustrations:—

1. A certain Indian hyæna is called the 'laughing' hyæna, from the peculiarity of its cry. The voice of this—the spotted—hyæna, when excited, 'resembles a most unearthly laugh' (Sclater).

2. An Australian bird—a kingfisher—is known as the 'laughing' jackass for a similar reason; and Baden Powell speaks of the 'ridiculosity' of the laugh both of the bird and the hyæna—in reference apparently to its resemblance to human laughter. Sclater says that the note of this 'laughing kingfisher,' as it is called in the 'Guide to the Zoological Gardens of London,' 'strangely resembles a rude, powerful laugh.'

3. The francolins of South Africa—birds, species of *Sclerоptera*—have notes that 'resemble a succession of hysterical laughs—at first slow, but increasing in rapidity and strength till they suddenly cease' (Andersson).

4. One of the cries of the dog-hyæna is what Murray calls a 'laughing chatter.'

5. A pigeon—the Indian turtle dove—is called 'the laugher' (Schmidt).

6. Livingstone mentions an African (brown) ibis whose cry is 'a loud ha-ha-ha!'

7. Miss Cobbe describes the cackling, screeching or screaming, and yelling, in delight or exultation, of a flock of geese as 'almost indistinguishable from human laughter.'

It must be evident that in animals so different in structure and habits not only must the various forms of 'laughter' —so called — differ materially in their character even as mere sounds, but must also be the vocal expressions of very different feelings. In certain birds the laughterlike sound is either the ordinary note or call, or one of the ordinary or extraordinary notes or calls, intended to intimate their presence, solicit the society of their mates, issue warning of danger, or give expression to some other want or feeling. In the hyæna, and probably other animals, the sound emitted is more of the nature of a cry of annoyance or irritation. Only in the case of the geese is there any provable association of a sense and enjoyment of fun.

On the other hand, humour may be exuberant and yet not express itself in laughter, or in voice-sounds of any kind. The dog, for instance, shows his appreciation of fun in his sparkling, merry eye, in his facial features as a whole, in his rolling over and over, running about wildly or round and round, in his whole aspect and demeanour, look and manner.

Just as it has been shown that various animals possess the physical apparatus necessary for laughter—while they are actuated by those feelings or ideas that in man give rise to it—so it can be equally shown that certain animals are not only gifted with the physical apparatus necessary for the production and effusion of tears, and for the actions or phenomena of weeping and sobbing, but also with the emotions or conceptions that in man give rise to *tears and weeping*.

What have been described as true *tears* are shed—especially under the emotion of grief — by a considerable number and variety of animals, including the dog, horse, elephant, bear, rat, donkey, mule, various deer, soko, chimpanzee, mandrill, orang, titi or other monkeys or apes, cattle, camel, giraffe; while there are other animals—such as the parrot (Watson)—in which, though tears are not

specified, the action of *sobbing* or weeping is nevertheless represented as occurring. Whatever may be the case in man, it would appear that in other animals the phenomena of weeping or sobbing do not necessarily involve the presence of tears.

Whether accompanied or unaccompanied by demonstrable tears, the action of *weeping* occurs most frequently, in other animals as in man, under the powerful influence of *grief* or sorrow of all kinds, especially that resulting from or connected with bereavement—of young, mates, companions, or human masters. But weeping is the fruit also of other emotions, some of them of a curious or a complex character. Thus I have notes of its occurrence from—

1. Mere emotionalness—as in certain monkeys, from being pitied by man (Darwin and Rengger).
2. Despair—as in the stag at bay (Low) or the caged rat (Reedy).
3. Fright, terror, or fear—in the titi or other monkeys (Humboldt, Cassell).
4. Captivity and its resultant melancholy—in the Indian and Cingalese elephant (Darwin and Tennent), and in monkeys (Darwin).
5. Joy.
6. Bodily pain, fatigue, or want—such as thirst.
7. Sense of ill-usage, including wrong or degradation.
8. Fond or sad memories.
9. Sympathy.
10. Disappointment or chagrin—as in monkeys (Rengger), and elephants (Houzeau).
11. Sadness and regret.
12. Old age or the dying state.
13. Pettishness at non-compliance with whims—as in the young soko (Livingstone) and orang (Yvan).
14. Dread of punishment—in chimpanzees or other Quadrumana trained to man's service.

Weeping, like laughter, then, arises from emotions and ideas of the most opposite kind, as well as from bodily sufferings or impressions—all just as in man.

It is not enough, however, merely to assert that various

animals shed tears under certain mental influences; it is desirable, if not necessary, to give illustrations of the fact, with the names of the authorities who have observed it.

Mrs. Burton, speaking of thirsty horses in the Syrian Desert, says, 'I have seen the *tears* roll down their cheeks with thirst.' Of a mule crippled by a two-inch nail in its foot, 'His face was the picture of pain and despair. Tears streamed out of his eyes.' And, again, of a camel, 'Tears streamed from the eyes.' Cows '*weep* often when in sorrow,' says another authoress—Mrs. Mackellar. She mentions one sold by its mistress, who had brought it up, that 'would stand lowing pitifully all day long . . . . with the tears streaming down her face.' A young soko, Livingstone tells us, if not taken up in the arms like a child, when it desired and appealed to be so carried, engaged in 'the most bitter human-like weeping.'

Chimpanzees, in Sierra Leone, that have been trained to carry water-jugs for man, 'weep bitterly' when they let them fall and see them in pieces at their feet ('Wonders of Nature and Art'). Dr. Boerlage shot a female (mother) ape in Java, that fell mortally wounded from a tree, 'tightly clasping a young one in her arms, and she died weeping' (Büchner).

A giraffe, wounded by a rifle shot, was also found to have 'tears trickling from the lashes of his dark, humid eyes' (Sir Wm. Harris). Some old rats, finding a young one dead by drowning, 'wiped the tears from their eyes with their fore-paws' ('Animal World'). Gordon Cumming describes large tears as trickling from the eyes of a dying elephant.

Steller, the companion of Behring's second voyage of discovery, asserts that the mother sea-bear of Kamtschatka 'sheds tears;' while the male parent, 'when he sees that his young is irrevocably lost . . . . like the mother, begins to cry so bitterly that the tears trickle down upon his breast' (Hartwig). Dr. Yvan mentions an orang that wept when a mango was taken from him, just as a child would have done.

In certain cases there is *sobbing* without tears, or the

utterance, unaccompanied by tears, of cries, groans, or moans, though arising from the same kind of causes as weeping. Tennent describes sobs and 'choking cries,' as well as tears, in the captured elephant; while Houzeau speaks of a young one 'crying' on the death of its mother. Buckland alludes to sobs in the dog.

Weeping, like laughter, is sometimes very humanlike in its character. Thus Bontius describes the weeping of an orang as resembling that of a woman.

Not only, however, do certain animals themselves shed tears, but the dog at least frequently understands the significance of those of *man*. That is to say, it connects them with sorrow or suffering, and this connection leads it to offer fond expressions of condolence — to make various attempts at consolation.

It only remains to note that, as in man, the *same cause*— the same emotion—may give rise equally to laughter and tears in the same or different animals — at the same or different times, according to their temperaments or idiosyncrasies. Thus joy, especially when sudden and excessive, produces sometimes laughter, sometimes tears, sometimes neither, just as in man (Darwin).

CHAPTER XVI.

EXPRESSIVENESS OF ANIMAL LANGUAGE.

LANGUAGE—of whatever form—among the lower animals is used voluntarily and deliberately, or involuntarily, mainly for the following purposes:—

1. To *call* each other or man, either particular individuals or the various members of a family, or of a flock or herd. These 'calls,' which are in an infinite variety of forms, include—

a. Sexual calls—for suitors or mates in the season of sexual love, for the purposes of pairing.

b. Maternal and parental calls to the young, having reference chiefly to two great objects—food-supply and protection from danger.

c. Assembly calls—to rally or collect, or keep together, the scattering or scattered members of a flock or herd—in war, the march, or migration.

d. Summonses for aid.

2. To make *intimations* or announcements of—

a. Their intentions, purposes, plans—including their decisions.

b. Their wants of all kinds—including their urgency.

c. Information or intelligence of various kinds—relating, for instance, to food, booty, or danger.

3. To hold *consultations*—deliberative councils, discussions, or debates on important 'questions of the day'—concerning, for instance, the necessity for war, the means of defence, the sites of emigration-fields, or the time for migration.

4. To conduct public *trials*, apparently by jury, including advocacy, accusation, conviction, judgment, and punishment.

5. To give expression to their *emotions* or feelings, changes of mood or temper, passions, appetites or desires—including their sense of hunger and thirst—of cold, heat, or fatigue.

6. To give *warning* of danger—including the use of signals.

7. To attract *notice* or attention.

8. To *intimidate* or terrify, including menacing or threatening, in jest or earnest—for instance, in—

a. Practical jokes.

b. Prey-capture.

c. War or defence.

9. To *charm*, captivate, or fascinate—

a. The other sex in courtship.

b. Prey—in order to their capture.

10. To issue *orders* or commands; make *requests* or demands.

11. To make *responses* or replies.

12. To *demonstrate* or point out places or things desirable, or the reverse.

13. To *repress* or conceal their real feelings, ideas, or intentions.

14. To *challenge* to trials of strength—in love-rivalry, war, or competition for leaderships.

Such a specification of the *applications of animal language*, however, gives no adequate idea of its *expressiveness*. In order to the formation of some proper conception of the number and variety of the mental states represented by the different forms of language in the lower animals, the following alphabetical table has been compiled. The words or terms used or enumerated are those employed by the various writers mentioned in the Bibliography. No doubt some terms are mere synonyms of certain others, different writers using different words to express what is virtually the same idea; but, in other cases, even where words may appear to be, or to be capable of being made or regarded as, synonymous, there are shades of difference, which may or may not be apparent with or without due observation and reflection—that is to say, without proper

study of the intricate subject of animal language and its interpretation.

Absorption.
Abuse.
Accident or unusual contingency, sense of.
Acquaintanceship.
Address, paying.
Adoration.
Advantage, sense of.
Adventuresomeness.
Advice, power of giving.
Affectation.
Affection.
Affirmation.
Affliction.
Affront, desire to offer.
Affront, sense of.
Agitation.
Agony, or Anguish, physical or mental.
Aid, desire for
— intention of giving.
Alacrity.
Alarm.
Alertness.
Amity.
Amorousness.
Amusement.
Anger.
Animation.
Announcements, making and receiving.
Annoyance.
Answering to questions.
Anticipation.
Antipathy.
Anxiety.
Apathy.
Apology.
Appeal.
Appetite, sexual or other.
Apprehension.
Approval.
Ardour.
Arrogance.
Astonishment.
Attachment to persons, places, other animals.
Attention.
Authority, sense of.
Aversion.
Awe.

Bad temper.
Begging.
Belief.
Benefit, sense of
Benignity.
Bereavement, sense of.
Bewilderment.
Blame, imputation of.
— sense of.
Blandishment.
Boastfulness.
Buoyancy of spirits.
Business, sense of.

Cajolery or Coaxing.
Call.
Calmness.
Caricature.
Caution.
Chagrin.
Challenge.
Chastisement, sense of.
Cheerfulness.
Choice.
Churlishness.
Civility.
Coldness, or Coolness, of feeling.
Combativeness.
Comfort, sense of.
Command.
Companionship, love of.
Compassion.
Complacency.
Complaint.
Complaisance.
Compliance.

Compliment, paying.
Compliment, sense of.
Conciliation.
Condemnation, sense of.
Confession.
Confidence.
Confusion.
Congratulation.
Consciousness.
Consequentiality.
Consternation.
Constraint.
Contempt.
Content or Contentment.
Conventionality.
Coquetry.
Cordiality.
Courage.
Courtesy.
Courtship.
Covetousness.
Cowardice.
Coxcombry.
Craftiness.
Craving—for love, society, or companionship.
Cruelty, sense of received.
Cunning.
Curiosity.

Danger, sense of.
Decision.
Defeat, sense of.
Defence.
Defiance.
Dejection.
Delight.
Deliverance, sense of.
Delusion.
Demand.
Demonstrativeness
Demureness.
Deprecation.
Depression, mental.
Derision.
Desire and desires.
Despair.
Desperation.
Despondency.
Detection, sense of.
Determination.
Difference, sense of.
Difficulty, sense of.
Diffidence.
Dignity.
Disappointment.
Disapprobation.
Discomfiture, sense of.
Discomfort, sense of.
Discomposure.
Disconsolateness.
Discontent.
Discovery, sense of.
Disdain.
Disease, mental and bodily.
Disgrace, sense of.
Disgust.
Dislike.
Disobedience.
Display, love of.
Displeasure, sense of man's.
Dissatisfaction.
Distress, mental.
Disturbance, or Disorder, mental.
Diversion.
Doubt.
Dread.
Drollery.
Drudgery, sense of.
Duty, sense of.

Eagerness.
Earnestness.
Ease, sense of.
Ecstasy.
Effrontery.
Effusiveness.
Elation of spirits.
Embarrassment.
Emergency, sense of.
Emotion.
Emulation.
Encouragement, desire to give.
Encouragement, sense of.
Endurance.
Energy.
Enjoyment.
Enmity.
Ennui.
Enquiry.
Enthusiasm.

Entreaty.
Envy.
Error.
Escape, sense of.
Esteem.
Exaltation, sense of.
Exasperation.
Excitement, mental.
Execration.
Exhaustion, bodily
Exhilaration.
Exhortation.
Existence, sense of.
Expectation or Expectancy.
Expostulation.
Exuberance of spirits or of emotion.
Exultation.

Falsehood, sense of.
Familiarity.
Farewell or Goodbye.
Fatigue, bodily.
Favour, design to confer.
Favour, sense of.
Favouritism.
Fear.
Fearlessness.
Feelings and feeling.
Fidgetiness.
Fierceness or Ferocity.
Fieriness of temper or spirit.
Fondness.
Forebodings.
Freedom, sense of.
Fretfulness.
Friendliness or Friendship.
Fright.
Frivolity.
Fun.
Fury.

Gaiety of spirits.
Gallantry.
Generosity.
Gentleness.
Gladness.
Glee.
Gloom, or Gloominess, of spirits.
Glory, sense of.
Good breeding.
— feeling.
Good luck, sense of.
Good nature, temper, or humour.
Good wishes.
Gratification.
Gratitude.
Gravity or Graveness.
Greeting.
Grief.
Gruffness.
Guardianship.
Guilt, sense of.
Happiness.
Hate or Hatred.
Haughtiness.
Heartiness.
Hesitation.
Holiday, sense of.
Hope.
Hopelessness.
Horror.
Hostility.
Humiliation, sense of.
Humility.
Humour.
Hunger.
Hypersensitiveness.

Ideas.
Identity.
Ignorance.
Ill humour or nature.
Illness, bodily and mental.
Imagination and Imaginativeness.
Imitation.
Impatience.
Imperiousness.
Importunity.
Imposture.
Impudence.
Inclination.
Incoherency.
Indifference.
Indignation.
Indolence.

Information, or Intelligence, giving and receiving.
Injustice, sense of.
Innocence.
Insanity, various forms of.
Insolence.
Insult, desire to offer.
Insult, sense of.
Intentions.
Intentness.
Interest.
Interrogation.
Irascibility.
Irritability.
Irritation.
Investigation.

Jealousy.
Jeering.
Jest.
Joke.
Joy.
Justice, sense of.

Kindness, sense of.

Lamentation.
Languishing.
Liberty, sense of.
Likings.
Listlessness.
Loathing.
Longings.
Loss, sense of.
Love, sexual.
Lugubriousness.

Magnanimity.
Malice or Maliciousness.
Meaning.
Meanness.
Meekness.
Melancholy.
Memory, retentiveness of.
Menace.
Mercy, receiving and showing.
Merit, sense of.
Mildness of disposition.
Mimicry.
Mirth.
Mischievousness.
Misery.
Mockery.
Moodiness.
Mourning and Mournfulness.

Necessities or Needs.
Negation.
News, giving and receiving.
Nobility of character.
Novelty, sense of.

Obedience.
Obstinacy.
Offence, sense of.
Order, sense of.
Orders, giving.

Pain, both of body and mind.
Passions.
Pathos.
Patience.
Peace, sense of.
Peevishness.
Pensiveness.
Peremptoriness.
Perfunctoriness.
Perplexity.
Pertinacity.
Pertness.
Petition.
Pet or
Pettedness.
Pity and Piteousness.
Petulance.
Plaintiveness.
Plans.
Playfulness.
Pleading.
Pleasure, both of body and mind.
Politeness.
Praise, appreciation of.
Preference.
Pretence.
Pride.
Promptitude.
Propitiation.
Protection, sense of.
Protest.

Provocation.
Punishment, sense of.
Purpose.
Pusillanimity.

Quarrelsomeness.
Questioning.

Rage.
Rapture.
Rebuke.
Recognition.
Recovery, sense of.
Refinement.
Reflection.
Refusal.
Regret.
Reinstatement in, or Restoration to, favour, sense of.
Rejoicing.
Relaxation, sense of.
Release, or Relief, sense of.
Remonstrance.
Repartee.
Repentance.
Reply or Response.
Repose, sense of.
Reproach.
Repugnance.
Repulsion and Repulsiveness.
Requests.
Requirements.
Resentment.
Resignation.
Resistance.
Resolution.
Respect or Regard.
Restlessness of mind.
Revenge.
Rivalry.
Rudeness.

Sadness.
Safety, sense of.
Salutation.
Satire or Sarcasm.
Satisfaction.
Scolding.
Sedateness.
Self-absorption.
— approbation.
— compliment.
— conceit.
— control.
— defence, sense of necessity for.
— gratulation.
— importance.
— love.
— reliance.
— repression.
— satisfaction.
— sufficiency.
Selfishness.
Sensations.
Seriousness.
Shame, sense of.
Shelter, sense of.
Shyness.
Signs or Signals.
Slyness.
Soberness or Sobriety.
Solemnity.
Solicitation.
Solicitude.
Sorrow.
Spirit.
Spite or Spitefulness.
Sportiveness.
Sprightliness.
Stealthiness.
Strangeness, sense of.
Strength, sense of, or of its absence.
Stupidity.
Suavity.
Submissiveness and Submission.
Success, sense of.
Suffering, mental or bodily.
Sulkiness.
Sullenness.
Supplication.
Surliness.
Surprise.
Suspicion or Suspiciousness.
Sympathy.

Temper.

Tenderness.
Terror.
Thanks.
Thirst.
Thoughtfulness.
Thoughts.
Threats and Threatening.
Timidity.
Timorousness.
Transport.
Trepidation.
Triumph, sense of.

Unconcern.
Understanding.
Uneasiness—of mind or body.
Unseen, dread of the.
Unusual, sense of the.
Upbraiding.
Urbanity.
Urgency.
Uxoriousness.

Valour.
Vanity.
Vehemence.
Vexation.
Victory, sense of.
Vigilance.
Vivacity.
Vulgarity.

Wants.
War, disposition or readiness for.
Warning.
Watchfulness.
Waywardness.
Weakness, sense of physical.
Weariness.
Welcome.
Wilfulness.
Willingness.
Wishes.
Wistfulness.
Woe.
Wonder.
Wooing.
Worry, sense of.
Wrath.
Wrong-doing, sense of.
Wounded feeling.

Yearning.

CHAPTER XVII.

INTELLIGIBILITY OF EACH OTHER'S LANGUAGE.

THE different *individuals of the same species* thoroughly *understand the language of the species*, whatever be its nature. It is as intelligible to the whole community as is the language of any nation of men to the individuals composing the nation; much more so indeed, when it is remembered that among civilised peoples at least, what is called and considered the proper language—as written, printed, and spoken—of the people, is intelligible only to the educated; while the special language of one class is unintelligible to those who are not members of the class, or who have not studied its special phraseology.

Animals then of the same species have *mutual understandings*. They show in a thousand ways how speedily and readily they interchange feelings and ideas; receive and communicate information; realise each other's position, wants, or wishes. They make instant response or reply to the calls or signals of their fellows, whether in the wild or domesticated state, and domesticated to those of wild animals, or *vice versâ*—as in the goose, ape, or elephant. The number and variety of the feelings and ideas which are communicated to each other by the ant and hive bee are pointed out by Houzeau. The leader of wild horse or elephant troops makes his wishes or orders on the march or in defence thoroughly known to the rest (Watson).

Gestures of mutual understanding between the sexes take place in the fowl (Darwin). The mother fox's plaint or wail is understood and obeyed as a danger signal by her young (Houzeau).

The dog conveys his wishes and purposes to his fellows (Low), but how he does so does not always appear—for instance, among the pariah dogs of Damascus, according to Mrs. Burton. The dog issues invitations to his companions —to share food, to go poaching, to assist in defence or punishment, and the others accept or decline these invitations (Cobbe).

Certain animals use different danger signals for different kinds or degrees of danger, and their relative significance is thoroughly understood by those for whom they are intended. Certain other animals engage in their assemblies in discussion or debate, which is understood by the whole body of auditors or spectators. The alarm notes of the sentinels of many gregarious animals are instantly understood. In ants on the march there is communication of intelligence throughout the troop. They show their mutual understanding in asking aid, issuing invitations, and giving advice (Figuier).

Bees give each other information of their projects. Their sentinel or watchman issues his summons to defence, which command is instantly understood and obeyed. They 'beat to arms' (figuratively) when defence becomes necessary in threatened danger (Figuier). Their power of communication with each other before they swarm is commented on by Watson. The warning cry of cattle in danger collects the whole herd, to act on the defensive or offensive (Pierquin). The despatch and reception of news is described in rooks by Watson. The issuing and accepting of *invitations* is illustrated by bower-birds inviting their neighbours to their dancing assemblies.

Sound becomes an important means of establishing identity—of recognising each other—when there is a change both of aspect and smell. For instance, the bleat of the sheep or lamb, after sheep-shearing or washing, leads to mutual recognition by mother and offspring (White). Response of the young to the old—to the parental call-notes of birds, for instance—implies an understanding on both sides of the significance of the sounds (Houzeau).

According to Belt, foraging ants follow each other by *scent*, and communicate intelligence—for example, as to the

presence of danger or booty—'by the different intensity or qualities of the *odours* given off.'

In some cases a species—or certain individuals thereof—learn the language, or to understand the language, of *other species*, genera, or groups.

The *rapidity* of the *acquisition* of the language of other species varies greatly, as does also necessarily *facility* of acquisition. Thus of a hen that, as foster mother, brought up, or tried to bring up, three orphaned ferrets, Romanes says: 'It took the hen one day to learn the meaning of their cries of distress.' But he could 'not say that the young ferrets ever seemed to learn the meaning of the hen's clucking.'

The acquisition of the language of other species is not confined to, though it is best illustrated by, the *imitation of voice-sounds*. It includes the whole phenomena of *mimicry* —of

1. Man's voice, speech, tone, talk, whistle, words.
2. The songs of a considerable number of birds.
3. The calls or cries of various animals, made use of for the purposes of decoy or deception.

The mocking-bird successfully imitates the hen's call, and the cat's mew (Houzeau). The starling mimics man's voice, the cries of certain quadrupeds, and the song of various birds. The spotted hyæna counterfeits the bleat of the lamb.

Acquired songs consist frequently of combinations of the notes of *different species*, forming a medley therefrom. However, in acquiring the notes or songs of other birds, it occasionally happens that a species or individual *loses* its own—for instance, the redbreast (Houzeau).

From intimacy of association with them, the *dog* soon comes to understand the language of several *different genera and species* of other animals. For instance, it learns the signification of various bird-calls, including those of poultry, and takes advantage of this knowledge; its action or behaviour is in accordance with the nature and significance of each cry or call (Houzeau).

The language of blandishment or command of the collie

is understood both by sheep and shepherd (Watson). The horse learns to appreciate the cries of sporting dogs—for example, in the case of Houzeau's horse, who understood the cries that intimated the successful driving of rabbits to shelter, and that constituted a sort of call to both master and horse to come and perform their share of the task in the hunt. Various cries used as danger signals are understood by animals of other species (Darwin). Various animals understand—have probably been taught by sad experience to do so—the signals of sentinel bees, when, for instance, they warn off intruders (Figuier).

A case is given in 'Science Gossip' of sparrows understanding the call—by bark—of a terrier to be fed; and of both dog and sparrows remembering the feeding and the call winter after winter. Ants of different species understand each other's signs (Forel). Intercommunication of suggestions, plans, wants, and wishes takes place between the horse and cow (Macaulay).

CHAPTER XVIII.

ANIMAL MOTIVES AND THEIR INTERPRETATION BY MAN.

PIERQUIN, Montaigne, and other authors have pointed out, and dwelt upon, the fallacies connected with man's *interpretation* of the feelings, ideas, or thoughts of other animals; they have shown the *fallibility* of man's inferences, when he endeavours to form a judgment regarding their *motives* or causes of action—their reasons, inducements, or impulses. We are constantly reminded that we do not know—and that there is no possibility of our knowing—what are, for instance, the impressions or ideas of the outer world formed by animals.

We can only *infer* that similar actions in other animals are determined by similar motives to those which actuate *man*. It is only by the *comparison* of our own actions, in relation to our own motives, that we can infer what are the motives of other animals when they perform similar actions, or are placed in the same kind of circumstances. But man's inference may be wrong in what is essentially the attribution of *human motives* to the lower animals; similar actions in other animals may be attributable to causes or motives that are really dissimilar; in short, the processes of feeling and reasoning in other animals may not be the same as in man.

But, it appears to me, that a bugbear is made of this theoretical objection, which is one of the arguments adduced in support of the opinion of those who deny that there is any community of character between the 'reason' of man and the 'instinct' of the lower animal. Precisely the same line of argument might be adopted in regard to man himself; it might be fitly applied to the comparison of the

mental condition of the civilised man and the savage, the scholar and the boor, or to the human mind in its different phases of health and disease.

There is insuperable difficulty in discovering or realising the animating motives, reasons, causes, or spurs of action even in fellow-man. None of us can project our own minds or personalities into those of our brethren, and regard events from exactly the same view-point. Hence the impossibility of the mathematician or metaphysician sympathising with the ideas and feelings, or understanding the mental condition, of the child or savage, idiot or lunatic, of the criminal and uneducated classes of his own country.

It need not, therefore, be surprising that even greater difficulty should be encountered in realising the mental condition of other animals, differing much from man in structure, habit, and surroundings. But the difficulty is one that is materially lessened by *proper study*. The man who investigates the subject of mind upwards instead of downwards; who begins with an examination of the simple before he encounters the complex; who inquires first into the dawn or rudiments of mind; who analyses its elements in the lowest organisms, gradually extending his observation to the higher, and ending with man; who keeps ever in mind the allowances to be made for differences in structure and habit between man and other animals; and who, oblivious of man's asserted supremacy, habitually views animal action from what might be called an *animal* platform, is likely to arrive at honest and satisfactory conclusions. Those who assert that the motives of other animals are different from those of man will have some difficulty in setting forth the grounds on which they base their assertion.

Assuming, then, that the attribution of *human motives* to the lower animals is both legitimate and necessary, there are in the first place certain motives that are at once simple and transparent—*obvious and intelligible.* This category includes, for instance—

1. Hunger and thirst; 'want' in all its forms or degrees.
2. Sexual love.

3. Maternal or parental affection.

4. Need of protection or assistance; necessity of all kinds.

5. Love of life.

6. Sense of danger.

7. Desire for pleasure or self-gratification, including frequently the gratification of mere momentary desire.

8. Temptation.

9. Hope or anticipation of reward, benefit, or attention.

10. Dread of pain, fear of punishment included.

11. Gratitude, and the sense of benefit or advantage.

12. Love of society or companionship, including attachment to man.

13. Love of approbation.

We experience no difficulty in understanding how hunger, or maternal love, should be a cause or source of daring or boldness even in timid animals; how gratitude should lead to attachment to man; how ill-usage should beget antipathy or fear, and these feelings lead to desertion of a master; how dread of punishment, of dismissal from a master's home, or of being left behind, should induce the dog or cat to seek safety in flight, or to resort to various ingenious devices for circumventing man; how fear of capture of themselves, or their young, should cause various birds to have recourse to successful ruses. All these and many others are common and easily appreciable motives or incitements to action in the dog and other animals.

It has here to be remarked that, on the one hand, the same motive in different animals, or even in the same animal at different times, may produce very *different lines of action*—just as is the case in man; while, on the other, the same course of action or behaviour may be determined by the most *diverse motives*. For instance, hunger or maternal love gives rise to a great diversity of conduct, while friendship for man is determined by many motives—both selfish and unselfish.

It is equally noteworthy that, as in man, certain motives or feelings are apt to *dominate* for the moment over others, the result being determined by the character of that which

is dominant. Thus weariness of life may overcome in old dogs the natural love of life—or the tendency in all animals to self-preservation, leading occasionally to *suicide*; just as maternal affection prevails over a selfish—and it may be added prudent—regard for personal safety in the stork or other bird that perishes with its young rather than leave them to themselves in a conflagration.

As in man, in a large number of cases, motives in other animals are obviously numerous, conflicting, and complex; and, in proportion as they are so, it becomes difficult to determine, on the one hand, what influences are present, and on the other, which of them is dominant. It is in this group of cases—of conduct determined by *complexity of motive*—that man is apt to err most in his interpretations or analyses of, or inferences from, animal conduct.

In the first place, the *apparent* motive, or motives, may not be the *real* ones; those which alone appear may not be the only ones. Illustrations of this proposition are so abundant that it must suffice to give a few as typical of the kind, variety, and number of those which might be adduced.

When a dog saves the life of its tipsy master, who is perishing in the snow, by laying itself upon or beside its master's body, and thereby imparting its own heat, it is obvious that the incident is capable of various explanations. The motive of action may have been one of several, or there may have been a combination of several, motives. The explanation most apt to be adopted—the motive most likely to be assigned—in such a case is that which is least creditable to the lower, and least derogatory to the higher, animal. It is suggested probably that there could have been no idea of life-saving on the part of the dog — no realisation of its master's danger, and consequently no devising of means of averting it or protecting him. There was, perhaps, a mere selfish consultation of its own comfort —even a stupid ignorance of the kind and amount of danger to both its master and itself. So far from desiring to impart heat, its object, it may be alleged, was to withdraw it in its own favour. But, on the other hand, the conduct was pecu-

liar to a certain dog under exceptional conditions; the result was such as would, or at least might, have arisen in man from a realisation of danger, a knowledge of the best available means of avoiding it, and an unselfish or self-sacrificing readiness to adopt these means.

We know, moreover, from other incidents that certain dogs are capable of the highest *self-sacrifice*; that they realise danger not only as it threatens themselves, but also when it approaches those in whom they are interested; that they are ingenious in devising the means of preventing or removing it. We equally know that dogs, like all other animals, have a keen love of life—that they are selfishly ready to take all necessary means for self-preservation, and that some are too selfish, and others too stupid, to place their master's interests before their own.

While, therefore, the dog that saved its master from death by cold may have been selfish or stupid, it is at least quite as legitimate to suppose that it may have been sagacious and self-sacrificing—in other words, that it was intentionally and consciously its master's saviour. That such *was* the case no man dare, however, affirm; that it may have been so is at least probable. In such a case it is only permitted to us to *suppose*—not to *know*—whether the dog had a definite object or motive, and what, if so, that object or motive was.

Escapes from new homes are common in certain runaway dogs; desertions from their masters' houses are so frequent that such animals are repeatedly 'lost.' Here, again, any one of several motive causes may be operative—such as affection for a former master or home, or dislike to a new proprietor or his abode; or the animal may be trained to abscond by one of those vendors of pet dogs so common in London, who in this way sell the same pug or poodle over and over again; or the action may be attributable to love of liberty; or it must be set down to caprice, or relegated to the category of eccentricity, individuality, or unexplained phenomena. Which—or whether any—of these motives or causes has determined the conduct it may be impossible to decide, or even to guess.

In certain assemblies of Shetland crows, described by Edmonstone and others, we have the *facts* that—

1. The assembly is general—birds of the same species flock in large numbers from all quarters to a given point;

2. There is a marked difference in the behaviour of different individuals in the assembly, including—

3. The punishment, or at least maltreatment, of one individual by the whole body—

and man's *interpretation* is that in such an incident we have a criminal trial by a general jury, including arraignment, evidence, conviction, condemnation, and the execution of capital punishment. All this may have been embodied in the proceedings of the assembly. But it is equally improper to assert that it was or was not so. The unsatisfactoriness of *man's speculations* as to the cause, or nature, of the phenomena of animal conduct is frequently, however, much more obvious.

The pecking to death of the wounded by birds—such as certain Indian crows—is not necessarily an indication of cruelty, rather than of humanity. It has the effect at least of putting an end to an animal's torments—of preventing death by slow starvation, or its falling into the hands of cruel enemies; while it also effectually puts an end, however, to all chance of its recovery.

When the American goatsucker and other birds change their nest on any interference with their eggs, the supposed motive may be prudence, precaution, fear of danger and of loss of eggs; but much more probably the action must be referred for its causation to the category of puerperal, morbid mental phenomena.

In the mockery or mimicry of birds there may, or may not, be an intention to annoy; but it is not easy—to say the least—to determine in what cases such a feeling or desire is present or absent. That it is frequently present is pointed out in the chapter on 'Practical Jokes.'

What may be the motive, feeling, or idea of the dog that day after day, week after week, or even year after year, couches upon its master's grave — as in the case of the famous 'Greyfriars Bobby,' of Edinburgh — is a question abundantly open to conjecture.

Mutual assistance may or may not involve desire or intention to assist—for instance, in—

1. Birds that accompany the African buffalo, rhinoceros, and crocodile.

2. Birds that warn man or other animals of danger.

3. Birds—such as the African honey-guide—that point or lead the way to honey stores.

So far from there being in such cases any *moral merit*, the ruling motive or idea may be self-interest. In the case of the African honey-guide its object is apparently selfish; for Livingstone tells us[1] that it flies in front of the hunter only till he arrives at the spot where the bees' nest exists, waits till he takes the honey, and then 'feeds on the broken morsels of comb which fall to its share.' But even here distinction may have to be drawn between real and apparent selfishness.

There may be a *selfish* reason—real or apparent—for humanity, as in the case of ants feeding and kindly treating as friends—not as slaves—their milk cattle, plant lice (*Aphides*) or beetles (species of *Clavigер*). Various authors have pointed out that Aphides are to ants—their captors, keepers, and masters—not mere prisoners of war; they are domesticated and happy. Whether or not the motive or purpose be a selfish one—an act of, or prompted by, self-interest—the procedure itself is obviously a wise, prudent, and commendable *policy*.

When harvesting ants nip off the germinating radicles of seeds prior to their storage, the possible result is a malting of the grain from the production of sugar; but it does not follow that the animals are aware of the fact that malting may or will occur, and that their destruction of the radicles has this end in view. They must be aware, however, of the necessity for destroying the radicle, and for thorough drying of the seeds in order to the proper preservation of the grain in their granaries.

An animal regarding itself for the first time in a *mirror* is less likely to be actuated by self-admiration than by mere surprise or wonder; or the reason may be curiosity or

[1] In his 'Last Journals,' vol. i. p. 164.

jealousy of an imaginary rival (Darwin). Nor is the strut of the peacock or turkey cock necessarily an indication of vanity or pride.

Pierquin ascribes the 'running amok' of the 'rogue' elephant to a thirst for vengeance. But if he is correct in this supposition, the animal commits a mistake in directing its enmity against man, seeing that its banishment is at the hands of its own species. It may be, however, in the elephant, as in man, that vengeance is frequently vicarious, being inflicted on the weak, defenceless, and innocent when it cannot be directed successfully against the strong, powerful, and guilty.

The subject of *motive*, or object, is further, though casually, discussed in other chapters, such as that on 'Deception.'

CHAPTER XIX.

UNDERSTANDING OF HUMAN LANGUAGE.

As known to the lower animals, the *language of man* does not consist of mere

1. *Words*, whether singly, or in combination, as—

2. Sentences or phrases in conversation; but it includes his—

3. *Looks* — facial expression, countenance-changes, the character of his eye.

4. *Actions* or movements, with gesture and gesticulations, attitude, manner, habits and observances, costume and its changes.

5. *Natural* voice-sounds, and their varied tones or intonations.

6. *Artificial*—musical or other—sounds, such as those made upon or by the bell, gong, horn, whistle, pipe, bagpipe, lute, drum, or bugle.

By dint of observation and reflection, certain dogs—notably the shepherds' dogs (or collies) of Scotland—that live in intimate association with their masters, that are man's fireside friends or companions, as well as his colleagues in work—perhaps even his accomplices in crime—teach themselves, or are taught by him, to *understand and appreciate* the *meaning or significance* of man's various modes of expression. They understand, for instance, his

1. *Conversation*—comments or remarks—at least when they themselves are spoken of.

2. *Proper names*—of persons, places, and things, including particularly their own names, the names of members of human households, and of household goods.

3. *Calls*—by voice or by various musical instruments.

4. *Signals*—of eye, look, action, including those which are called secret—which are preconcerted by and between, and understood only to, the animal and its master.

5. *Hints*—verbal or other.

6. *Instructions* or directions, orders or commands, including explanations and suggestions—verbal or other.

7. *Preparations* for food, punishment, exercise, going to church.

8. *Games* and sports.

9. *Negatives and affirmatives*—refusal and permission—and the various modes of expressing them, including the head-nod and shake.

10. *Praise and blame*, and their degrees, including encouragement, and the reverse—reproach or condemnation.

11. *Pleasure* or gratification, and their opposites—anger or displeasure.

12. *Esteem* and contempt.

13. *Tempers*, moods, or humours.

14. *Wishes*, wants, or desires.

15. *Intentions*, designs, purposes, aims, objects, plans.

16. *Invitations* and proposals.

17. *Promises.*

18. *Threats* or menaces.

19. *Oaths* and abuse.

20. *Irony*, sarcasm, or sneers.

21. *Fun* and earnest—pretence and reality.

22. *News.*

23. *Emotions* or feelings—such as grief; pity, love.

There would even appear to be a certain kind or degree of

24. *Divination* or prescience of man's very *thoughts* even, when unexpressed in any way, or at least not voluntarily and consciously expressed.

Certain dogs form the most correct and shrewd *guesses* at what man is thinking of or contemplating—for instance, when it refers to their probable or possible punishment for misdemeanour. But in such cases the result depends no doubt on keenness of observation, long experience, sagacious reflection, rapid inference, with a vivid sense of guilt and of personal interest in results.

That domestic animals know the meaning of the words, or combinations thereof, embodied in man's *orders* is familiar, as a matter of daily experience, to every master or mistress of household pets, to every farmer and farm servant, ostler and jockey, sportsman or huntsman, shepherd or ploughman, carter or waggoner, cabdriver, coachman, or postilion, dog-breaker and horse-trainer. Illustrations are abundant in every farmyard, stable, or byre, on every country road, in every town street, and in the homes, rich and poor, of the great majority of the population of all civilised countries. But notwithstanding the familiarity of the fact that the dog, horse, ass, elephant, fowl, cattle, parrot, and hosts of other animals understand, so as to obey, man's verbal commands, there is reason to believe that little or no consideration is given to the *number and variety* of the words and phrases that are embodied in man's commonest orders to servant animals.

In certain cases there may be a knowledge of the meaning of each individual word used in man's conversation, but, more generally and probably, his dog gathers only the general *purport* or scope of his remarks.

In either case not only is there a correct *interpretation* of man's meaning, but the animal acts appropriately upon its interpretation — by obeying his commands, complying with his requests, answering his queries, avoiding danger, attending at meals, showing sympathy, or fear, or other responsive emotions, supplying his wants, accepting his invitations or promises, adopting his suggestions, and so on.

Nor is the dog the only animal which thus understands man's language and is guided by it. The horse, cat, reindeer, elephant, sheep, cattle and goats, beaver, Barbary and other apes, trained and other monkeys, orang and chimpanzee, common seal, hedgehog, mouse, sea bear, dolphin, various fish, falcon, Chinese ducks, Chinese fishing cormorants, parrots, and other birds, and in general all tamed and domestic animals, understand one or more of the modes by which man expresses his ideas, wishes, or commands, as well as these ideas, wishes or commands themselves, however expressed. All of them, for instance, understand his

various *calls* to them to attend food-supply, and many of them know their own proper *names*. The military horse knows the significance of the various drum and bugle calls, and acts accordingly. The fireman's dog understands the fire alarm, and its knowledge of the meaning of such a signal leads on its part to the immediate and appropriate action of awakening the fire brigade (Houzeau).

Many animals, moreover, not only understand man's *questions*, but reply to them in various ways. The sea bear of the London Zoological Gardens understands its keeper's verbal language, and replies to his verbal questions by various sounds and gestures. The performing dog picks out certain cards containing, in printed letters, appropriate replies to the verbal queries of its master, as if it had read the printed answer before using it.

That form of man's language which is most generally understood by the greatest diversity of genera and species of other animals is probably his *call*, which is usually associated, directly or indirectly, with food supply for the day or shelter provision for the night. Not only, therefore, is the call readily understood—whether it is verbal or vocal, by the aid of sonorous instruments or otherwise—but it is promptly obeyed. Even the mouse ('Animal World'), the fishing cormorant of China (Fennel), and certain fish obey man's summons by mouth, whistle or otherwise.

Many domestic animals know their own *names* — the names, that is, attached to them by man and by which he is in the habit of calling them. Their own name is indeed the first *word* usually to which a definite *idea* is attached, whether by the child or young animal (Houzeau).

This is therefore man's first lesson to both—the bestowal of a personal or distinctive appellation. Such animals as the dog, horse, cat, and parrot, which live in more or less intimate association with man, very soon come to learn their own names, with their uses or applications by man. Eastern sheep answer to their names or to the calls of their shepherd, whose voice they distinguish from that of all other men. Similar phenomena occur in Greece (Hartley). This ordering or calling sheep by name is both an ancient

(Theocritus) and a modern (Wood) practice. Various fish kept in pleasure-ponds in gentlemen's demesnes also know their own master's voice or call, and sometimes even footfall or footstep, from those of all other individuals. They attend to the one and are indifferent to the other. The mention of a dog's name in ordinary conversation is frequently sufficient to rouse it at once from *sleep* (Houzeau). It has even been alleged that some dogs know man's names for their own sex—dog or bitch—and associate the proper idea with the said names or words (Houzeau). It is further of interest to note that dogs and other animals answer to their names when man's names are imitated by such birds as the parrot and raven. These birds know individual dogs by sight, and call them properly by their names, imitating man so successfully as to deceive the higher animals (Low)—both man and dog.

The number of animals that know the *names* of the different members of a human household, and of the chief articles of domestic use, is much more limited. This sort of intelligence is not uncommon, however, in the dog; and it is occasionally exhibited even by the cat. Thus we are told of a cat that knew the name of each member of a family, and the particular seats of each at table. If asked where is So-and-so—then absent—she would look at the vacant seat, then at the speaker, and if told to fetch him or her, 'she would trot upstairs, take the handle of the door between her paws, put her mouth to the keyhole, mew and wait to be let in,' to some particular room, containing the absentee (Clara Rossiter).

Certain dogs know not only when they are spoken *to*, but when spoken *of* casually in the conversation of their masters —conversation sometimes experimentally intended—but in other cases as certainly not intended—for dogs' ears. In both cases the result has been the same as regards the prompt and appropriate action of the animals. They are quite aware when they become the subject of man's conversation (Watson), and are naturally on such occasions all ear and attention, though the old adage too frequently holds good that listeners—unintended listeners, that is—are apt to hear

nothing good about themselves. Hogg, the Ettrick shepherd, who studied so intelligently and lovingly the character, intellectual and moral, of his companion and servant collies, gives several striking illustrations of the correct interpretation of their master's remarks made in conversation with his wife, family, or friends.

'If one calls out, for instance, that the cows are in the corn or the hens in the garden, the house collie needs no other *hint*, but runs and turns them out.' Hector, overhearing its master propose leaving it behind on a journey, went off alone and in advance, meeting its master at his destination. Sirrah, hearing him lament the loss of three flocks of lambs, without order set off in quest of them, and in the darkness of night collected the whole 700. Another family dog (bitch), on overhearing the day of her master's home-coming mentioned, never failed to go to meet him. 'She could only know of his home-coming by hearing it mentioned in the family' (Macaulay).

Further illustrations are to be found in the numerous cases of the sudden, temporary, or permanent disappearance of sporting or other dogs that have accidentally—unintentionally as regards man—overheard that—

1. They were not to accompany a master or mistress to church, to walk, or to sport;

2. They were to be destroyed by shot, drowning, or poison;

3. They were to be punished for some misdemeanour—

as well as in the shame shown by their retirement from a room on hearing a discreditable anecdote of themselves narrated (Scott).

The *parrot*, too, not only recognises its own name, both when spoken of and spoken to, but it understands agreeable or disagreeable, favourable or unfavourable, commendatory or disparaging news or comments, communicated or made in its presence (Houzeau). Like the dog, also, it appreciates the significance of the tone of voice, the look, or the gesture of its human visitors.

A *single word* uttered, and especially if emphatically so in the course of man's conversation, from the train of associa-

tions it instantly awakens, sometimes produces an effect that appears, by reason of its suddenness, almost magical. Thus the mention of the mere word 'rat' to a true, professional rat-catching terrier sets it on the *qui vive* at once; it becomes on the instant all alive and alert, its tail vibrating with the joys or excitements of anticipation. Again, of a certain dog that very much disliked cooked fowl as an article of dinner diet, its master writes, 'If we spoke of it in his hearing we missed him for hours,' and it was subsequently found that he went on such occasions for his dinner to the house of some intimate friends of the family, who, when they saw the dog, 'knew at once what the fare with us would be' ('Animal World').

The dog becomes also a very keen and successful student of man's *physiognomy*. It carefully scans or examines his countenance in order to the detection of its earliest clouds or sunshine. If it sees its master's face covered with frowns, it infers anger and expects kicks—an inference and anticipation that lead it quietly to get out of the way. If, on the other hand, it meets smiles or laughs, it greets its master joyously in its own way, reflecting and reciprocating his good humour. Should tears unexpectedly appear, it offers sympathy and condolence in forms as eloquent and unmistakable as man himself can use to brother man. In coming by such means to a conclusion how far it has reason to fear or to trust man, the dog is very much on a footing with the *child* (Darwin). It may be said to read equally well its master's smiles and frowns, laughter and tears, the language of his eye, lips, and head-movements—a reading that implies a wonderfully just estimate of man's temper, mood, or feeling.

'Performing' dogs, or other specially trained animals, understand and act upon *signs* or signals from their masters, which pass unnoticed by on-lookers. Thus smuggling dogs understand the significance of man's danger signals; and appropriate action follows in the form, for instance, of flight or concealment ('Percy Anecdotes').

Other intelligent dogs, such as the sheep-stealing collie and the poodle, can be taught to execute man's secret orders,

and so bamboozle or deceive on-lookers, or escape the observation of enemies or obstructives ('Percy Anecdotes'). All performing animals execute their performances mainly in obedience to man's signs or orders, whether open and public, understood by the audience and spectators—or secret and intelligible only to the performers and their trainer.

In some cases, however, in course of time there arises a certain spontaneity of action in such performances; for instance, in the case of the beggar's dog that goes forth alone in its master's service (Grenville Murray). Decoy elephants obey a single word or sign from their keeper, including signals that are secret, in the sense that they are unobserved or not understood by on-lookers (Watson).

But words as well as signs may be unintelligible to an audience, and yet quite intelligible to and by a performing animal and its master. For co-operation in theatrical and other public performances the words of a foreign tongue are sometimes quite as useful and quite as much employed as non-vocal signs or signals of any kind. Hence the advantage of a certain knowledge of *foreign languages*, especially French and German, to certain horses and dogs and their masters.

Frost tells us that 'circus horses are always spoken to in the ring in French;' and he mentions one so addressed by Newsome, the circus proprietor, that at once understood his words and acted upon his verbal hints or suggestions—for instance, in the discovery of a hidden handkerchief. Again, smugglers' dogs on the frontiers of France and Germany require to know, and do know, *both French and German* (Watson)—that is to say, they acquire linguistic knowledge comparable to the kind and amount thereof that a tourist must get up in order to the supply of his physical wants and the prosecution of his object—travel.

With or without words, sometimes simply from seeing what man is doing, the dog and other animals arrive rapidly at very correct conclusions as to his *object* or purpose, and they co-operate, or make efforts at frustration, as a sense of their own or of his interests may prompt. Sporting dogs understand their master's plan and purpose in shooting game,

and they enter into the spirit of his sport. In the same way other dogs enjoy man's games or children's romps, intelligently taking their proper parts, and usually when they do so take part, showing both to man and child excellent examples of good humour and control over their tempers, and of not permitting jest to run into earnest. There is appreciation of man's object even in chickens, according to Houzeau.

The working elephant of India requires only to be shown or told what man wants, has but to get a clear idea of man's object in doing a certain work, and of the mode in which it should be done, in order to execute the said work intelligently. Its mahout or cornac—otherwise keeper or driver —gives the necessary explanations in a *mixed language*, that is quite intelligible to the animal, composed partly of words, partly of gestures (Houzeau).

We read, moreover, of dogs accepting man's verbal *invitations* to dinner, and punctually keeping their engagements (Pierquin), and of Barbary apes also begging or fishing for invitations, just as children do (Cassell).

Ability to understand man's language implies—

1. A natural *aptitude* to learn it; and—
2. A special *study* of it.

And this aptitude and study, again, involve a high degree of intelligence, the power of close and keen, long and careful observation, the faculty of reflection, and ability to draw inferences from the facts of observation.

Per contra, in order to the *understanding by man* of *animal language*, a similar aptitude and study, similar mental qualities are required. And just in proportion as he possesses such an aptitude, and devotes to the study in question a similar amount of patience and perseverance, will be the nature and degree of the knowledge of animal language which he acquires. Observation, experience, practice, lead man to read the meaning of the looks, gestures, cries, or other forms of expression in the lower animals, just as they do his. Belt could tell, from its cries and without seeing it, whether and when a certain tame cebus monkey was hungry, eating, frightened, or menacing. The shepherd and sportsman understand the language of their dogs. Man

accepts, by acting upon, the danger signal of the dog and many other animals. According to De la Brosse, two West African chimpanzees on a voyage, 'at table, when they wanted anything . . . . easily made themselves understood to the cabin boy.' The signal barks of their dogs, and the significance of these various signals or barks, are known only to the smuggler or brigand, or master, who has learned their significance by careful study (Watson).

One of the results of this is that men and other animals that study each other's language arrive, in course of time, at such a kind and degree of *mutual understanding* as is of importance to both in their daily intercourse. For instance, man on the one hand, and the dog, horse, elephant, monkey, and, as a general rule, all 'performing' and domestic animals on the other, have a common understanding, which again involves what are really various forms of *conversation*, not necessarily in either party by voice or by sound. Hogg, in one of his tales—'A Shepherd's Wedding'—describes the shepherd, accompanied by his two collies, at tea in a minister's manse parlour. 'He conversed with his dogs in the same manner as he did with any of the other guests. Nor did the former ever seem to misunderstand him, unless in his unprecedented and illiberal attempt to expel them from the company,' the two animals never before having lost sight of their master, in-doors or out.

One of the many advantages of this mutual understanding between a horse and its rider is that the animal, accustomed to and fond of a particular master, learns to know the meaning of his least movement—of the inclination even of his body—and it acts accordingly, without word, whip, or spur.

Sir Walter Scott was of opinion that the *intercommunication of thought* between man and the dog is capable of great improvement, a belief in which I heartily share. The subject, however, belongs more properly to the chapters on 'Education.'

The dog at least distinguishes between man's *pretence* and reality, or seriousness, whether of intention or action (Watson); it knows what is *jest* and what earnest. Not only does it understand man's gestured *threat*, but—by rapid re-

flection apparently—it distinguishes that which can be carried out from that which is impotent. And its conduct is in accordance with its belief. For instance, when man pretends to throw a stone at a dog in a locality where the animal knows that there are no stones to be thrown, such a locality as an Irish bog or a stretch of sandy coast—it gives itself no concern about the futile threat, does not get rapidly out of man's range, as it would do under other circumstances (Houzeau).

ADAPTIVENESS.

CHAPTER XX.

GENERAL ADAPTIVENESS.

INSTANCES or illustrations are simply innumerable in the lower animals of their power or faculty of *adaptation to circumstances*; of accommodation to new, unforeseen, accidental, unusual, or exceptional conditions; of appropriateness of behaviour to time and place; of the use of proper and the best means to an end; of spontaneous modification of action. This adaptability—the range of which is as great as its character is sometimes remarkable—this determination of action by external conditions, which may readily be artificially produced for experimental purposes by man, implies or includes the operation of a number of important mental qualities or aptitudes, such as the following:—

1. *Ingenuity*, contrivance, cleverness, or inventiveness in device or design, in the variation of the means of accomplishing an object, including *fertility of resource*, which again involves *originality*, both in conception and execution.

2. Definite *purpose*, object, aim—with intention, deliberation, firmness, resolution, perseverance, and force of will to attain it.

3. Capability of surveying and comparing, one with another, each of a series of diverse means, and of judging and selecting the most suitable.

4. *Skill*, dexterity, adroitness, expertness, address in employing or adapting means.

5. *Profiting by experience*; the acquisition of knowledge—much of it experimental—as has been pointed out in another chapter.

6. Shaping a definite course or *plan* of action.

7. Seizure of *opportunity*, including vigilance and patience, watching and waiting for it, with discrimination in judging of its suitability.

8. Use of *strategy*, involving cunning and artifice, or deception.

9. Actuation by *motive*.

10. *Caution* and discretion.

11. Balancing of probabilities, implying thought or reflection, and frequently hesitancy or doubt.

12. Decision and courage, including promptitude in action.

13. Self-possession and self-control.

14. Association of ideas.

15. Knowledge of the relation of cause and effect, including an appreciation of consequences.

16. Knowledge and use of advantage, natural or artificial, fair or unfair.

17. Providence, prudence, foresight—including certain kinds of forecasting future events or conditions.

18. Perception or feeling of necessity.

The adaptation of means to an end; the variation of these means with the nature of the end, or with the difficulty of attaining it; and the manifold mental qualities that are called into operation by such adaptation and variation, are all illustrated by the following common phenomena of animal life or habit:—

1. The capture and use of *slaves* or servants, or other forms of subjection of the weak to the use of the strong.

2. The *wars* of certain animals—whatever be their object—including the arrangements both for defence and attack.

3. The overcoming of obstacles or difficulties, whatever be their nature.

4. The arrangements made for *cleanliness*, safety, and

salubrity of person or dwelling, including ventilation and elevation, and the removal of refuse.

5. The obtaining and use of *food.*

6. The construction of *dwellings*, including the selection of material.

7. The pursuit, capture, and disposal of *prey.*

8. Mutual assistance of all kinds.

9. Avoidance of disagreeables in work, duty, or otherwise; or of obstacles, enemies, or dangers.

10. Use of tools, instruments, or weapons—natural and artificial, including the use of baits and of money—all as pointed out in a special chapter thereanent.

11. *Organisation* in all its forms; also as discussed in a special chapter.

12. Preservation of life, either of each other or of man.

13. Storage of food for future use.

14. The stoppage of runaway animals—for instance, of horses and ponies, by dogs.

15. Discovery of, and action in, fires of man's dwellings.

16. The modes of murder and revenge.

17. Repair of injury to dwellings or other works of construction.

18. Taking selfish advantage of the labours of others.

19. Behaviour in emergency.

20. Correction of error—as shown in the chapters on '*Error.*'

21. Discharge of duties, self-imposed or imposed by man, including the economization of labour.

22. Means of attracting attention—each other's or man's—as pointed out in the chapters on '*Language.*'

23. Perpetration and concealment of crime.

24. Destruction or concealment of instruments of punishment, such as whips.

25. Arrangement of decorations to please taste, or to suit a special purpose, such as a nuptial assembly or ceremony.

26. The phenomena of charming, of making the best use of their personal attractions.

27. Succouring the wounded.

Among ants are to be found two distinct classes or kinds of *slaves*, viz.—

1. *Slaves proper*, equivalent to the helots of ancient Greece, the negro slaves of the southern United States, of Cuba or other West Indian islands or possessions, or those that are still kidnapped and sold by the Portuguese in central Africa—slaves that are employed as *body servants*, ministering to all the personal wants and comforts of their masters.

2. *Domestic animals*—equivalent to our *milk kine*—animals subjected to domestication for the sake of saccharine or other fluids or substances they secrete, and of which ants in particular are fond.

The relation of *ant helots* to their masters is much more intimate than that of any human slaves usually is to their owner; for, in certain cases, not the comfort only, but the very existence of the master depends on the service of the slave. Sir John Lubbock tells us that certain slave-keeping ants 'not only cannot clean themselves, but will die because they cannot feed themselves, even when surrounded by the best of food, if the *slaves* are not there to give it them.' These slaves are indispensable then as *nurses* to their adult masters; but they act also as *domestic servants*, doing all the ordinary household work of the ant-nest.[1]

Of other animals *domesticated by* ants for the sake of their useful products, the most familiar are *Aphides*, or plant lice, which yield a much-prized honeydew. Ants own whole 'flocks' of these plant-lice, which they have subjected to as true and as kindly a domestication as in the case of the common cow by man. The *Hypoclinea*, a Nicaraguan ant, milks leaf-hoppers, or scale insects, as well as Aphides. Certain other ants keep brown scale insects for the sake of their honeylike secretion. To use Belt's expression, they 'farm' them, just as we do milch cows. These Aphides and scale insects are made to exude their honeydew by stroking their sides with the antennæ of their masters, the sagacious ants. Ants also feed beetles for the sake of their saccharine secre-

[1] 'Daily Telegraph' report and comments on his lecture on ants at the Royal Institution, London, in January 1877.

tions. According to Lubbock,[1] 'some ants have small blind beetles in their nests, kept there apparently as domestic animals. A kind of small wood-louse also lives with them on amicable terms, much as cats and dogs do with men.'

'Aphides,' says Belt, 'are the principal *ant-cows* of Europe. In the tropics their place is taken, in a great measure, by species of *Coceidæ* and genera of *Homoptera*, such as *Membracis* and its allies.' At least four genera of ants in Nicaragua keep scale insects as we do cows, these genera being *Solenopsis*, *Pheidole*, *Pseudomyrma*, and *Hypoclinea*. *Solenopsis* builds domed galleries, or *byres*, for the protection of its *insect cattle*, and otherwise tends them carefully (Belt). Baird, again, mentions the use of *Cercopidæ* as milk cattle by ants.

Slavery and *domestication*, however, are by no means the only forms in which one animal is rendered subservient to the convenience, use, or sport of another—a younger or weaker generally to an older and stronger individual. One of the most signal, as well as amusing and instructive, instances of direct subjection of one genus and species to the stronger force of will, greater ingenuity and masterfulness of another is the riding of dogs, horses, asses or pigs, by baboons and other apes or monkeys (Cassell). A cat has been known to make use of a dog's back to get ferried across streams.

Bullyism—petty tyranny—is perhaps as common among other animals as in man. Thus one determined horse sometimes bullies another (submissive) one into its service by biting, teasing, nagging or driving; that is to say, it exacts a forced, unwilling, compulsory service.

In various forms of *usurpation* certain animals take selfish, unfair, and sometimes violent advantage of the labours of others; and to them are quite as applicable as to man Virgil's lines, well known to every schoolboy, beginning 'Sic vos non vobis.'

The *wars* of ants exhibit a number of interesting phenomena, including—

1. The use of reinforcements.

[1] As reported in the 'Daily Telegraph' in January 1877.

2. The construction and defence of fortresses, fortifications, camps and barricades.

3. The employment of tactics and manœuvres, including various forms of strategy or stratagem.

4. The use of surprise.

5. The posting and vigilance of sentinels.

6. The securing and proper use of vantage ground and conditions.

7. The adoption of definite plans of action.

8. The use of telegraphy by signals, or other means of conveying intelligence or expressing wants.

9. Taking precautions against surprise, and for retreat or failure.

10. Artificial intimidation.

11. The perception and taking advantage of weak points or posts in an enemy's body, mode of attack or position.

12. Public recognition of victory and defeat.

Black ants in the Mauritius send messengers with intelligence, call up an army, procure reinforcements when and if required, both army and reinforcements assembling at some fixed rendezvous (Baker). In the case of these and other ants, assistance is sent when asked for and where it is wanted; there is obvious judgment as to both time and circumstance (Figuier). They concentrate or divide their forces as occasion requires (Nichols). Their tactics or manœuvres include the regulation and change of route in their marches (Kirby and Spence); the use of pitfalls, ambuscades, or other means of entrapping an enemy; the falling upon him when off guard and unprepared—in other words, taking him by surprise; the employment of feints, ruses, lures, or snares, or of many of the forms of deception and cunning held necessary or permissible in human warfare.

On the return of ants from a military or marauding expedition, their *slaves*, who have remained at home, at once recognise the signs of success or non-success, and act accordingly. If their masters come back as conquerors, they are received with flattery, compliment, and attentions; the victors are relieved of their prisoners, offered food, and otherwise respectfully waited on. But in the opposite

event of failure, of return as conquered instead of conquerors, the reception is characterised by sulkiness and indifference (Figuier).

In ants' wars there is a cessation of the fight at night and a renewal of it at dawn ('Percy Anecdotes'). In their marches the active, if necessary, drag the sluggish (Davies). In their fights volunteers frequently make sacrifices for the sake of the rest—*pro bono publico* (Houzeau). Ants make, moreover, special provision for extreme danger (Figuier).

As in man, *courage* has sometimes to be *stimulated* or inspired in or for battle. This is occasionally done by the female to the male—by the physical operation of the *vis a tergo*—pushing from behind (Wallace). In other circumstances their industry, perseverance, patience, endurance, energy, affections, require *encouragement*, enticing, inducing, cajolery, or other arts of the one sex towards the other, of the old to the young, or of companions to each other.

Ants construct *defensive works*; their 'hills' or nests have, sometimes at least, masked doors and galleries (Figuier). Even in peace times, moreover, as a measure of precaution against intrusion or surprise, ants close their gates or doors at night, and open them in the morning unless in the case of rain (Darwin, Nichols, Figuier). *Fortifications* or barricades, however, are not confined to ants nor to war times. Barricading of the entrance to the comb is a well-known defensive expedient of bees against the intrusion of the death's-head moth (Kirby and Spence). Watson cites cases of magpies doing the same against other birds. Certain birds fortify or protect their nests with prickly shrubs.

Strategy is not confined to ants nor to war. On the contrary, it is commonly exemplified in a great variety of animals, and in reference to the capture of prey or booty. Indeed, we need go no further for ample and striking illustrations than to our domestic cats and dogs in their pilferings from our larders or dinner tables. In them and other animals strategy sometimes involves diplomacy, and diplomacy, hypocrisy—all of a kind that would do credit, or discredit as it may be viewed, to human courtiers and statesmen—and all, moreover, as pointed out in the chapter on '*Deception*.'

A commoner form, however, is that illustrated in such means of prey-capture as the following on the part of an astute American wasp, a dirt-dauber or builder. Desirous of capturing a doodlebug beetle that was beyond its reach in the bottom of its hole, the wasp tried the earth all about the mouth of the said hole so as to obtain the driest, selected it, scratching with its forefeet so as to throw the dust into the hole, which it gradually filled, peeping down now and then to see the result of its operations. The natural result was that the poor beetle was driven to clamber upwards, till at last he poked his head, blinded by dust, above ground, when he was at once seized by his sagacious enemy. There are other cases in which, in order to blind an enemy, dust is literally, as well as figuratively, thrown into its eyes (Broderip). The Barbary ape, for instance, literally flings dust in the eyes of its human or other foes (Watson); and there are cases in which sagacious animals, such as the elephant, for other purposes, such as self-extrication, or the extrication of other animals, from wells or pitfalls, have resorted to the serviceable and suitable expedient of gradually filling up the cavity, of whatever character, by some solid material, such as branches of trees or hurdles.

Different animals have different means of *rousing* each other, or their masters, into alertness—for instance, from the sleeping state. Ant-watchmen awaken sleepers in the morning by strokes with their antennæ, or by bites if necessary (Huber). Certain birds, again, rouse their sleeping masters by pulling their hair or nightcap, or pinching the ear ('Animal World'). A dog that had discovered a fire in its master's premises gave alarm by jumping upon the beds occupied by the master and his family, licking their faces to arouse the sleepers. Where this failed in one case, it seized a boy's ear with its teeth, and shook or pulled it forcibly till the boy awoke. Then it conducted those who got up to the scene of the incipient conflagration ('Animal World'). A regimental dog, during the Crimean war, visited the sentries at night. If they were asleep, he would quietly watch and wait beside them, apprising them instantly of any threatened danger; while if they were awake and on the alert he passed

on to the next ('Chambers's Journal'). The various—many of them ingenious—modes in which dogs, cats, and other animals attract man's attention are described in the chapters on '*Language.*'

In all kinds of rivalry it is common for animals to seize any natural *advantage* over an adversary; such as the incidence of light, or the favouring character of ground. This is a sort of fair or legitimate advantage recognised in all the rivalries of man. Thus Wynter tells us of a rat taking advantage of *light* in a fight with a ferret, and its proving successful in the fight so long as it held its well-selected position. Zincke refers to the choice by 'a cat, when attacked by a dog, of the best position for defence the locality offers.' Spiders and scorpions, and many other animals, 'take up advantageous positions where they expect prey to pass' (Belt). Small birds chase the owl by daylight for sport (Watson), knowing how feeble is its power of day vision, and how helpless it is thereby rendered. One of the commonest forms of taking advantage is making use of a victim's helplessness by injury, sickness, or otherwise. And this sort of advantage is taken of man himself when ill, disabled, wounded, dying. Moreover, so thoroughly do certain birds and other animals realise their own *power* of torment, assault, or prey in proportion to the *powerlessness* of an enemy, that their boldness is proportioned to the helplessness, real or supposed, of their victim.

Another kind of advantage, of which dogs and other animals are fully sensible, is that of *man's protection.* Hence they dare and do things under his auspices, or in his presence or house, which they would never venture upon alone. They may even presume upon such protection or patronage by acts of impotent and impudent defiance or insult. The sense of the protection or power of *numbers*, of union, of co-operation and organisation, gives the same feeling of power, and imparts the same kind of courage; so that an Eastern dog, in its own territory, among its own fellows, who will rush to its aid at once in case of attack, barks its defiance or utters its threats with a confidence that would be absent were it alone.

The importance of taking an enemy at *unawares*, when

off guard, not expecting, and unprepared therefore for, intrusion or attack, is recognised by many animals, including bees and ants (Figuier) and the weasel (Baird). The pisoti tries to surprise the iguana while the latter is asleep (Belt).

Modes of ordinary *defence* against the attacks of enemies include a variety of efficient means of protection, involving usually organisation and co-operation in a common purpose. Thus musk oxen, if surprised either in family or as a herd, 'form a square, the young ones being in the centre and the old outside with their heads down; or else the bull, placed as a sentinel, takes to flight and the others closely follow, the placing of their outposts being astonishing' (Payer and Copeland). Cows protect their young by forming a circle round them, while cattle, as well as fowls and turkeys, surround the wolf or other enemies in a circle (Pierquin).

Illustrations of ingenious *ruses* in the capture of prey, in the punishment of offenders, in the shirking of disagreeable duty, are innumerable. A crane in the Zoological Gardens, London, being annoyed while feeding by a pertinacious sparrow, at length pretended indifference; but when the tormentor came within range in order to steal a share of the crane's food, the latter bird stuck its beak into the sparrow, intending to kill it. Failing in this, however, and then deliberating how to dispose of its victim, the crane thrust it under water in a tank, and it was saved from drowning only by one of the keepers ('Animal World').

This incident, again, is a type of others that are of frequent occurrence, relating on the one hand to pretended unconsciousness, helplessness, or apathy, and on the other to the various forms of deliberate *murder*—forms suited to place, time, and other circumstances. 'Science Gossip' tells us of a magpie pulling a cat's tail to divert it from its food, and similar stories, no doubt true, are told of monkeys, ravens, crows, and other animals that are equally mischievous, ingenious, and designing. The Nicaraguan alligator lies quite still on river banks, as if dead, so as to catch animals that unsuspectingly approach it. To catch waterfowl it floats like a log on the water, with only that part of its head containing its eyes above the surface, furtively watching its

prey. When it approaches the birds, having estimated their exact position and distance, it wholly submerges itself quietly, comes up under the unwary prey, and drags them by the legs under water. It is also said to kill wild pigs by half burying itself in the ground in the forests on the same river-banks (Belt).

The construction of *nests* or other forms of dwelling affords—in relation to site and material, for instance—many illustrations of adaptiveness. As to *site* or position, it has first to be noted that water-hens and swans raise the level of their nests with the rising of the water of ponds or lakes, of streams or rivers, in flood, constructing pillars for them (Watson).

Various birds expose their nests or their openings to the sun, and shelter them from the wind, or they seek the shade, avoiding the sun, according to climate. In other words, they select a proper locality as to exposure or shelter (Houzeau). They sometimes provide double openings, for egress as well as access, using the former in case of intrusion or surprise by enemies. Watson mentions a wren opening a new entrance to its nest simply to escape publicity or notice. As to *size*, the beaver, for instance, adapts the size of its private dwelling to the increase of its family (Watson, 'Percy Anecdotes').

The selection of *material* for nest building is even more apparent. In general terms it may be said that many, if not most, birds make choice of that material which is at once most accessible and most suitable, including *manufactured* material of man's. Thus in the southern United States, in the weaving or lining of their nests, birds make appropriate use of 'vegetable hair'—the *Tillandsia usneoides* of botanists. On the other hand, Mr. Schwendler of the telegraph department of India, in a communication to the Asiatic Society of Bengal in 1874, describes crows' nests as made of fragments of thin telegraph wire, or (in one case) of the wire used in corking soda-water bottles; and he contrasts the ingenuity or sagacity of the bird with the mental status of the human natives 'who, in the construction and arrangement of their houses, had not ad-

vanced much by the introduction of western civilisation.' Some birds give up the use of moss in favour of wool in nest-making or lining. The yellow-hammer uses man's thread, twine, and ribbon in the attachment of its nest (Houzeau).

Wasps, in their nest-making, have been known to make use of coloured paper shavings covering certain strawberry beds in a garden, reducing them to pulp *secundum artem*. The observer describes the regularity of the undulating lines of colour which were carried round and round the cannon-ball-like nest that was suspended to the branch of an apple tree.[1] The President of the Entomological Society of London, in February 1875, exhibited a nest of *Pollistes gallica*, a wasp caught on the Esplanade at Corfu, of which nest the cells were partly constructed of coloured paper taken from some posted play-bills ('Nature'). In these two cases the *colour* of the paper may have partly been an attraction.

Some leaf-cutting ants *ventilate* their underground galleried dwellings, regulating their atmosphere both as to *temperature* and *moisture* by opening or closing certain apertures, and by taking care that the fragments of leaves which they carry into these chambers are neither too dry nor too damp (Belt). The same ants tunnel under, so as to avoid crossing over, the rails of a tramway, making fresh tunnels when the old ones are intentionally stopped up. Certain African ants construct chimneys or air-shafts for their nests in case of floods, the shaft opening above the high-water level.

The *repair* of injury in works of construction involves, *inter alia*, perception of weakness, and of the necessity of remedying it by greater strength, while it calls forth energy as well as unanimity in co-operation. Drone or other bees consolidate or prop up a tottering comb by the construction of buttresses, pillars, or other supports, as has frequently been proved in experiments made by Huber or others with a view to test their sagacity in this respect; or they fasten weak combs more securely. In other words, they erect tem-

[1] 'Glasgow Weekly Herald,' January 13, 1875.

porary scaffolding (Watson), just as man does, and only in emergency—when it is required.

On the other hand, some of the higher animals, perceiving man's object, either prevent his repairs—for instance, of fences—or destroy them as rapidly as they are made. There is sometimes *systematic undoing* of his work—for instance, in trap making and setting (Houzeau).

Many of the arrangements connected with the collection, preservation, and use of *food* illustrate a thoughtful adaptation of means to ends—an adaptation frequently the result of repeated *experiment* and as frequent failure. As concerns the gathering of food, various insects *perforate* the *corollas* of flowers in order expeditiously to get at the honey they contain. In the case of bees with certain ericas or Cape heaths in our greenhouses, the tubular corolla 'being too long and narrow for admitting the body, and too deep for the proboscis to reach the base, where the honey is placed, they pierce the tube of the corolla from the exterior, and thus procure the honey with ease' (Moore). Bees make a hole at the base of the corolla of *Antirrhinum majus* in order to get at the honey without entering the tube of the flower (Mrs. Plarr), and certain honey bees do the same in the French bean and scarlet-runner (Lubbock).

The same boring of holes in flower-tubes by humble bees has been noticed in America by Meehan; and what is of greater interest, as illustrating how ready animals even far down in the zoological scale are to take advantage of *ready-made* means to ends, the hive bee uses the orifices so made by the humble bee in nectar extraction from flowers (Darwin). The glutton sometimes contrives to secure the bait, without itself being entrapped, by undermining, attacking from behind, or other means of destroying the action of the trap or of detaching the bait. The black bear breaks off branches from trees, and throws them on the ground in order to collect at leisure the nuts they bear, sometimes partially gnawing a branch, as a man would perhaps saw it, for its easier breakage (Houzeau). The mother black bear of North America hauls or pushes aside timber logs in order that its cubs may obtain the grubs or larvæ that harbour

themselves underneath (Gillmore). Hens wait and watch patiently the splitting up of firewood for the sake of the embedded larvæ (Houzeau). A bear in Asia Minor, according to Dr. van Lennep, found access to a flock of sheep penned in a stable by descending the chimney. After killing several and gorging himself, 'he piled their bodies in the wide fireplace, and climbing thereon escaped unperceived.'

Much *contrivance* is expended on the obtaining access to or procuring of food. A siskin belonging to a friend, and the performances of which I have myself seen, pulls up on a wheel and axle a thimble-full of seed that it cannot otherwise reach and tilts it up, when the last seeds are left, so as to capsize them on the floor of the cage. In this case there was no tuition of the bird. No doubt pulley and thimble, with its supply of coveted provender, are provided. But the bird has taught itself to use the pulley and get at the seeds in its own way, and in the proper way—the way that man himself, if intelligent, would choose under comparable circumstances. As the result of its own reflection—probably as the result also of experiment—the sagacious bird devised the appropriate means for the given end.

Again, a wood-pigeon helped itself and a companion to food from a pheasant's feeding-box by both of them sitting on the lid, so as to open it by their joint weight. One had tried it but failed, its single weight being insufficient. Judging it, however, a mere question of weight, the aid of another individual was asked and obtained. The first comer must have ascertained for itself the 'trick' of the box—the means by which it was, or might be, opened—and it overcame the difficulty of insufficient weight by resorting to *co-operation*.

One of the most ingenious and effective means of procuring food-supply is the *ringing of bells* for it by the goat, dog, cat, or other animals (Watson), an expedient that has frequently also as its object access to a house or room. A cat belonging to Archbishop Whately's mother was in the habit of ringing the parlour bell 'whenever it wished the door to be opened' (Macaulay).

Various animals *stupify*, without killing their prey, in

order that it may be quietly conveyed away as a source of food-supply to themselves or their young. 'This stupefaction is usually produced by some sort of stinging or poisoning, by the injection into some part of the body of the victim of some fluid having narcotising or paralysing properties, the result being helplessness and harmlessness in the victim.

Certain ants of Nicaragua 'use their stings to paralyse their prey.' A bug there also probably kills much larger and more powerful animals than itself—for instance, a cock-chafer—by injecting a stupifying poison while its victim is asleep. 'Other species of bug certainly inject poisonous fluids.' Nicaraguan wasps also benumb by stinging, so as to render them quiescent and removable to their nests, various spiders, grasshoppers, or horse-flies, storing them away while still alive for their grubs to feed on (Belt). An African *sphex*, another insect, makes holes in the ground, and places in them stupified insects along with her own eggs; while another species watches this operation, and when this provident mother leaves in quest of more provender, lays her alien eggs in the hole (Livingstone), just as the cuckoo does in reference to the eggs and nests of many other birds.

The *storage*, burial, or concealment of food for future use by themselves, their eggs, or young, implies in many cases its proper preparation or *preservation* for storage. The Alpine hare of Mongolia lays in 'a store of hay for winter use, stacking it at the entrance of its home. The hay is collected towards the end of summer, carefully dried, and made into little stacks. . . . This [hay] serves for its couch underground and for food during the winter' (Prejevalsky). This careful *drying* of damp fodder is frequently required prior to its storage.

Certain leaf-cutting ants, if a shower wet their leaf burdens, leave them outside to dry. When properly dried by the first sunshine they are carried into the nest, but if sodden they are left to rot outside (Belt). So-called 'harvesting' ants air or sun damp grain, so as to dry it, at proper periods or under appropriate circumstances, storing it in granaries (Houzeau, Sykes), removing husks and

refuse. Not only so, but by some suitable means they *prevent* the *germination* of stored seeds. This is usually supposed to be by their biting off the germinating ends (Watson). Wallace suggests that they do so simply by 'continually using for food those seeds which begin to germinate, and that there always remain many seeds whose germination is delayed.' But whatever be the means adopted, we know what the end accomplished is. Certain harvesting ants also climb up the stems of shepherd's-purse, bite off the capsule, take out the seeds, transport, accumulate, and store them (Moggridge).

Many animals make *caches of surplus food*, of what remains after all the present calls of hunger have been satisfied; the surplus being buried or concealed sometimes in holes scraped in the earth, and again ingeniously covered up so as not to attract notice, or under rocks and stones. The carrion crow removes the refuse of fishermen's nets by portions to above highwater mark, depositing them under rocks and stones (Montagu). The burial of food in order that it may become 'high' is said to be characteristic of the retriever breed of dogs ('Nature'). But in other cases, though buried or concealed food may become tainted or putrid in the course of time before it is consumed, it is no part of the animal's object in hiding or storing it that it should become so.

Certain animals have to *dismember* their prey or tear up their food in order to its transport or consumption. Certain shrikes impale or transfix their prey on thorns in order to pull them to pieces; in confinement using a nail for the same purpose if it be provided by man or is accidentally accessible (Montagu). Foraging ants cut their prey to pieces for convenience of carriage (Belt).

The modes of *administering food* to, or of feeding, the young, sick, aged, or helpless, involve a number of deliberate processes; such as—

1. Crushing or soaking hard substances.
2. Masticating them; and
3. Putting the bolus down the throat.

Colnett, in his 'Voyage to the South Seas,' says that he

observed an old bird in the act of supplying three young ones with drink by squeezing the [juice of] the berry of a tree into their mouths (Jesse). Houzeau tells us of a duck soaking hard bread in water, and so softening it.

As regards the *capture of prey*, certain animals *drive* their game, just as man does, in some cases into pitfalls or ambuscades. The porpoise drives its prey as packs of dogs do the hare in coursing (Baird), or as the collie does sheep; and the wolf, pelican, and other animals do the same.

The somewhat common phenomenon of dogs stopping *runaway horses* or ponies on our streets or roads illustrates, *inter alia*—

1. The wonderful control exercised sometimes by a small animal over a large one by virtue of its superior intelligence, courage, and force of will; the supremacy, in other words, of mental or moral over mere physical strength; and—

2. The recognition of the *rights of property* or ownership—for the captor at once gives up the reins it holds between its teeth to the proper driver or rider of the runaway.

The 'Animal World' gives the case of a retriever—a certain Jack, well known in Glasgow—that stopped a runaway pony in the usual way. The pony was harnessed in, and had run off with, a spring cart belonging to the gamekeeper at Kilmaronock, Dumbartonshire. Pursuing the runaway, the said gamekeeper saw the pony suddenly drawn up, and on overtaking it 'found the dog standing on his hind legs, with a firm hold of the reins in his mouth, and keeping the horse at a dead stand.' He at once, it is added, 'civilly gave up the reins to the proper driver.'

Another case is given in which the dog acted as a groom, leading the runaway horse by the bridle ('Animal World'). In like sagacious manner dogs have been known to stop the drifting away of boats, and even to tow back drifting boats. Thus we are told of a Labrador dog that swam after a boat that had got adrift, and without any sort of direction from man seized the tiller rope, that was dragging in the water, and by its means towed the boat ashore against a breeze-ripple.

A certain small ant in Africa masters a much larger

common fly by simply tiring it out by its greater pertinacity. 'By seizing a wing or leg, and holding on till the fly is tired out' (Livingstone), it overcomes superior size and strength—another illustration of the fact that in other animals, as in man, there is frequently a dominance of mind over matter in the practical affairs of life—that 'knowledge is power,' and can be applied as such.

Various animals afford *aid* to each other when wounded, or otherwise in need of it, in a great variety of appropriate ways. Thus certain sparrows that failed, by seizing its wings with their bills, to lift a wounded companion, so as to convey it to a position of safety, got a twig, and while the maimed bird took hold of its centre by its bill, two of its companions seized, one each of the ends, so raised the helpless sparrow from the ground, and removed it to a safer place ('Animal World').

Many other arrangements for *mutual advantage* or aid involve adaptiveness. Thus titi monkeys cuddle together as children do for mutual warmth and companionship (Cassell), and mice, as well as probably many other animals, creep together for mutual heat. Mice, moreover, clean each other's fur.

Equally ingenious and successful are the means adopted frequently for their own *personal advantage* or comfort—for instance, in easing themselves of their burdens, or of lightening them when they cannot throw them off. The expedients of the horse, ass, and mule to get rid of a rider are too familiar incidents to require more than reference. But there are endless other instances of similarly effective ingenuity. Thus mules lighten their burdens by soaking them in water when they have reason to believe they consist of substances—such as sugar or salt—that will dissolve readily in water, distinguishing such substances from others—such as cotton or woollen goods—that will become more weighty by the absorption and retention of water (Watson).

This category includes the *devices* resorted to for the preventing of irritation or galling of the neck or other special parts of the body, or general inconvenience from chains or collars, in the ape, dog, buffalo, raven, and other animals

(Watson). An orang carried its chain by coiling it and throwing it over its shoulder, as man would have done, or by suspending it from its mouth, holding it in its teeth (Cassell).

We might go on to any extent multiplying and varying such illustrations of adaptiveness in the lower animals; but instances are to be found in almost every chapter of this book, and further detail here is unnecessary and undesirable. It is desirable, however, to call attention to the evidences of judgment, of calm and deliberate reflection, or of rapid thought and equally rapid decision that everywhere present themselves.

Such an evidence is the *hesitancy* so frequently shown in determining on a course of action, the animal being obviously puzzled or bewildered, on the one hand, as to the nature or amount of danger, and on the other, as to the best means of avoiding it. In the dog especially *irresolution* may frequently be noticed; the animal is obviously 'of two minds;' it cannot for or at the moment come to a decision—'make up its mind' in one direction or another; it is weighing, perhaps, its fears and hopes, likes and dislikes, and it has not yet determined the preferable or proper course of action. Dogs may often be seen pausing for reflection, for a consideration or contemplation of ways and means; for deliberation, for instance, at the bifurcation of a road—which of its two branches should be followed. Elephants, too, ponder over the best means of doing their work before arriving at a decision ('Animal World'). Such hesitation or doubt involves a comparison of different means in relation to their adaptability to compass a given end.

Another important evidence is to be found in animals usually obedient to man—such as sporting dogs—venturing sometimes to think and act for themselves, *using their own discretion* instead of obeying orders, or acting according to use and wont; even setting up their own judgment in opposition to that of their master, and acting upon their own judgment—in other words, independently of him. And it is further noteworthy that in such cases, as in so many others, the lower animals frequently show their superior intelligence,

and when they have a sensible, liberal-minded master, they reap the fruit of their superiority by his commendation for their acting, under exceptional circumstances, on their own discretion and for the best.

Berkeley tells us of one of his dogs, a certain Smoker, going to fetch a shot pheasant which happened to fall among a lot of unflushed birds. After advancing a certain distance, it stopped short and returned, deeming it better not to put up the living birds. Another dog—Wolf—being ordered to drive rabbits out of the shrubbery, declined because it proved to contain a covey of young pheasants.

Under other circumstances the dog, while adopting man's suggestions, supersedes them by its own if it finds or thinks its own better (Nichols). Though, as a rule, in the many cases in which other animals co-operate with man, his animal accomplice shows an unquestioning acquiescence in his arrangements, this is by no means always the case; for it sometimes not only most emphatically but most successfully *protests* against both them and him, and, in short, takes its own way or refuses all co-operation.

CHAPTER XXI.

ORGANISATIONS.

THE power and practice of *organisation* among the lower animals includes a whole series of phenomena of the highest interest—phenomena that involve the possession and application, or exhibition, of the *highest* mental and moral faculties. Such phenomena are—

1. Forms of *government.*

2. Respect for, and submission or obedience to, constituted *authority.*

3. The supremacy of *strength,* bodily or mental, or both conjoined, including the perception, recognition, and appreciation of *superiority.*

4. *Union,* combination, co-operation, concerted action for specific purposes, including compacts or agreements, and alliances or associations, offensive, defensive, or otherwise.

5. *Division of labour,* including taking turn in duty or playing parts in a performance.

6. *Method,* order or orderliness, regularity or system, including the *classification* of ranks, castes or clans in society; with *promotion* and *deposition.*

7. The force of *discipline.*

Writers on the habits of the lower animals have described various *systems of government* as existing among them, including the following:—

1. The *monarchical.* Among certain animals there are kings and queens, with all the paraphernalia of royalty, such as—

a. Royal chambers or apartments.

b. Royal body-guard.

These kings and queens obviously vary in their status and functions, as illustrated by the very different positions occupied by—

1. The king of the quails, of vultures, of herrings (Houzeau, Watson).
2. The king and queen of certain Termites (Büchner).
3. Queen bees (Huber, Figuier).

The influence of the *queen bee* is in many respects a remarkable one. She leads or directs her subjects (Huber) just as other and male chiefs do their flocks or herds. Her absence or sterility leads to *anarchy* in the populace, to a general dissolution of society, marked by the loss of all activity, physical and mental, by hopelessness, the want of courage or spirit, the development of theft and rapine—in general terms, by utter demoralisation. Her disappearance, too, causes general emotion and commotion, aimless running about, idleness and apathy—in short, a kind of *mental derangement* for the time. The effect on her subjects is paralysing. *Experimental* excitement and calm may be produced at will by removing and replacing her. Joy and satisfaction, moreover, are produced by the receipt of a new queen. All this arises from the presence or absence of what Figuier calls 'a moral tie.' Just as among male leaders, rival bee queens *contend for supremacy*; their fights are characterised by great rage, animosity, fury or ferocity, are accompanied by general agitation or tumult in the bee community, and end in the reign of the victor (Huber).

This government of bees by a queen is one of the most striking instances among the lower animals of *female supremacy*. But it is not the only one. Figuier describes the queen bee as president of a republic, with female vice-presidents; and there are also among bees and ants *amazons*, female troops or soldiers (Westwood). According to Combe there are exceptional cases—as in goats—where the leader of a flock or herd is a female.

Certain Termites, says Büchner, 'have a perfectly organised state, with king, queen,' and other ranks in society, and an elaborately constructed building for their residence. 'In

its interior is situated a so-called royal residence, with chambers and galleries around for the attendants.'

2. The *republican*. Republics have been described in the ant and bee (Figuier), in horses, dogs, and other animals. The *commonwealths* of the street dogs of Constantinople, with their curious regulations, have been described quite recently by the 'Times' correspondent there,[1] as they have also formed the subject of remark by Watson and other writers. Communities or societies of wasps live on terms of equality; they are free citizens of free cities, with no paupers; there are no despots and no despotism, according to Westwood and Figuier. But the same form of government, which by one observer or writer is termed a monarchy, with a king or queen at its head, is by another described as a republic, with a male or female president. It is quite immaterial how we speak of this or that system of polity in this or that genus or species of animals. The essential feature—one of importance in many ways—is the government of a community or society, of a band or troop, flock or herd, family or other group of individuals, species or genera, large or small, by a *leader or chief*.

The consideration of this form of government embraces the following features of interest:—

1. The principle of selection, and election or appointment.

2. Competition and ambition for rule and their results.

3. The subjection of the weak to the strong in body, mind, will.

4. The use and abuse of authority, including the power of command.

5. The appreciation of insignia of office or status.

6. The value attached to the possession of power and place.

In various forms leaders, governors, chiefs, commanders, patriarchs, masters, rulers, or heads, are to be found in many social animals, directing and defending the groups into which they are divided. They occur, for instance, among or in wild, military, and pack horses, Eskimo dog teams, bands of smuggling dogs or of dogs in Eastern towns, such as Con-

[1] During the Servo-Turkish war in January 1876.

stantinople, camels, deer, oxen, mules, sheep, elephants, buffalo, ass, kangaroo, goats, certain of the Quadrumana (such as the siamang gorilla, spider, howling, araguata, guereza, and other monkeys), cranes, swallows, cocks and hens.

These leaders are, as a general rule, *males* of middle age, sometimes elderly or old, possessing the following qualifications for office :—

1. *Physical* superiority; they are usually or frequently above the average in size and strength, being vigorous, robust, active, agile animals, that have proved themselves successful in combat and otherwise.

2. *Mental* superiority. They are distinguished, moreover, for their courage, cautiousness, sagacity, power of command, ability to act in emergency, so as to protect, defend, or direct their followers; for their experience; special knowledge of enemies or of ground; power of self-control, especially of control of temper; interest in the common weal; enterprise; ingenuity and perseverance in the overcoming of difficulties—in other words, adaptiveness.

This *superiority* is conjunct, physical and mental; for a merely huge strong animal, without the requisite intelligence to adapt its strength to circumstances, would be useless as a leader. But the superiority of the chief is, as a rule, of such a character as to be conspicuous, and to command or secure on that account confidence on the one hand, and respect on the other. *Confidence* and *respect* in their turn beget *obedience* or submissiveness, so that, while all animals that possess leaders *follow their lead* both literally and figuratively, some do so only too implicitly—for instance, in the case of sheep that rush after their bell-wether to their own wholesale destruction.

Generally speaking, leaders are of the *same species* as the animals they command; belong, perhaps, to the same small family or group, as in the case of certain patriarchs or mere heads of families or tribes. But in other cases, the chief belongs to a different *species* or genus, and this category includes omnipotent man. Thus the axis deer sometimes leads 'mobs' of kangaroos in Australia. 'The donkey in the district of Smyrna, in Broussa, and the Asiatic Olympus, in

Anatolia, and other parts of Asia Minor, is frequently employed . . . . as leader of a caravan of camels; for, contrary to the prejudices of the West, in Oriental lands Longears enjoys the reputation of being the most intelligent of hoofed beasts' (Hæckel). Mares are employed as leaders of droves of mules in Central America. The latter animals have a high respect for and pride in the horse as a 'distinguished relative;' hence they willingly accept a mare as their queen (Wood).

Man himself frequently becomes the leader of his flocks or herds, as in the case of shepherds in the East, who literally 'lead'—do not drive, as ours do—their flocks. Man is recognised literally and figuratively as its 'governor' by the dog; his right to command is freely acknowledged; the propriety of his orders or actions is, as a rule, not disputed. And it is important to note that in this case it sometimes, at least, happens that he gains and wields his wonderful power over other animals by the exercise of *kindness*, not of terrorism—by the supremacy of *love*, not of fear. Thus the command of the shepherd over his sheep in primitive countries, where the use of the sheep dog is unknown—for instance, in Palestine—is acquired by his constant association with his sheep, by his habitual kindly usage, whereby confidence in, and attachment to, his person or personality are produced.

Not only so, but man educates certain animals to be leaders and certain others to be followers; he trains the one to command, the other to obedience. He selects, for instance, certain rams or wethers, training them to command certain sheep, while he educates and accustoms the sheep to follow and obey the said leaders. The leader ram himself comes to understand and obey man's directions or commands, as given whether by signal or gesture, or in the form of verbal language, answering at once to his call; and, as the result of similar patient and kindly tuition, the whole of the flock learn to understand and obey the orders or directions of their wether (Youatt).

It is man, also, who selects the leaders in the case of Eskimo dog teams (Parry), and the horse-leaders of Eastern caravans (Macgregor) or of waggon teams (Pierquin).

Whether belonging to the same or different species, animal leaders have recognised and definite *duties* to perform, recognised equally by themselves and those under their control. These *duties* include, for instance—

1. The marshalling or ordering of large bodies of individuals.

2. The prevention of straggling and the collection of stragglers.

3. The maintenance of authority, including the suppression or punishment of insubordination.

4. The exercise of command and the issuing of orders by voice-sounds, signs, their own conduct or example, or otherwise.

5. The making arrangements for safety, defence or flight —including the substitution of order for confusion.

6. Guidance in the proper path, finding the way and showing it.

The animal leader has first to master his own position in all its bearings, and he usually takes pains to do so. For he exercises an authority one of the characteristics of which is a dangerous degree of *responsibility* to his fellows. His conduct is at all times before them, and he is liable at any moment to popular vengeance—in many cases it may be innocently or unjustly—to *deposition* and degradation, to *punishment*—perhaps of a capital kind—for any indiscretion, for any failure even in strength or courage. He is punishable for errors both of omission and commission, real or supposed, and the punishment may be both direct and summary. Thus Houzeau mentions a furious onslaught of a herd of buffaloes on their leader, a feeble old chief. So infuriated were they, so blinded by passion, so absorbed in the execution of their vengeance, that they were for the moment indifferent to the attack of man.

Generally speaking, the animal chief enjoys his supremacy only so long as he can maintain it, and this is usually *vi et armis*—by virtue of superior bodily strength. Whenever there is an approach to anything like decay—physical or mental, or both—it is sure to be espied by observant youthful, ambitious aspirants for his place and power. The

GENERAL LIBRARY University of MICHIGAN

result is a challenge and a duel, command remaining with, or pertaining to, the victor, be he young or old.

Naturally it is usually the younger antagonist that outstrips the older. While this success is a source of exultation to the one, it is a cause of *humiliation* in the other; and the sense of defeat, deposition, and degradation may be so keen as to lead to fatal pining from grief: the disgraced chief, in short, sometimes dies of his shame.

The principle of appointment in the case of all kinds of animal leaders is that the strongest, boldest, best in every way, should be called to the front and invested with supreme power; and this principle actuates man equally with other animals in the selection of an animal chief. Man chooses and instals a leading mule, horse, dog, or ram on the very same principle that leads a flock or herd to acquiesce in the *self-appointment* of some victorious young male. In human emergency of a serious kind, and on a large or public scale, it frequently happens that some man of marked individuality, but previously unknown, comes to the front as a volunteer leader, no one knows how, and his supremacy is at once, by tacit consent, acknowledged. Average people feel that he is 'the right man for the right place;' he has the requisite force of character, patriotism, and the ability to command universal confidence—and universal confidence is forthwith accorded, *for the time.*

For the man of the time is as liable to be discarded by a fickle people or populace as the proud and splendid stallion when he begins to lose that most indefinable of all qualities, *popularity.* So in animal panics, for instance, some previously unobserved or undistinguished individual starts, literally in this case, to the front, and is followed, for weal or woe, by the rest of a troop, herd, or flock.

There is ample evidence to show that *self-appointment* to the leadership is common among social animals; that the ambition of some young, energetic, vigorous male urges it to challenge and defeat the reigning chief, a defeat that is tantamount to the compulsory deposition of the one and the self-instalment of the other. This new appointment, however, is, under the circumstances, homologated or ratified by

the general assent or consent, so that, in one sense, it may be deemed a unanimous election. There is a practical and tacit acknowledgment of the fitness of things, the excitement being confined mainly to the combatants themselves, though the spectators no doubt look on with a varying degree of interest.

Though there is a strong probability there is no direct evidence in favour of the supposition that where no such candidate presents himself, and takes the law of competition and succession into his own hands—selection is made by universal suffrage—by placing in a position of command that individual among them best qualified to exercise the supreme power. There is very distinct appointment, and by a kind of universal suffrage, where the street dogs of Constantinople, as they sometimes do, select as their leader some animal belonging to a different quarter of the town—from among their natural enemies therefore—the motive for such a choice being *signal bravery* displayed by the favoured individual, either in attack or defence (Watson). There are certain other *official appointments*, both of a public and private kind, in which selection may or may not be made by and from the general body of a community, and with or without prominent candidature, or candidature or competition at all by the individual selected. Thus there must be some sort of appointment, by selection of the fittest, in the case of—

1. Mayors of towns.
2. Commissioners or ambassadors.
3. Spies or scouts.
4. Sentinels, sentries or outposts.
5. Nurses.

There are no doubt many intermediate cases in which one animal *takes the lead* of others without any special exertion, either on its part or theirs. There is no competition and no combat, simply because there is no rival. In such cases the manifest superiority is usually *mental* rather than physical, and, moreover, the mental superiority of one may overrule the physical superiority of all the others. Thus a proprietor on one of the western islands of Scotland, who

also farms his own estate, informed me that he had a pony which took the lead of all the horses on his farm, by virtue simply of its superior intelligence.

The possession of the leadership is apt to beget in different animals, according to circumstances of individuality or otherwise—

1. A sense of *dignity*, leading to or marked by demureness or gravity of gait, look and behaviour.

2. *Pride* in *rank*, office, or status, and in its insignia, badges, or trappings, involving sometimes consequentiality and a stickling for precedence.

The military horse displays its pride in its caparison, as it does in all the pomp or show of parade or procession; and the same sort of pride is exhibited by military elephants and by leading mules in teams. But not only do some of these animals—for instance, the military horse—recognise or appreciate their own rank, but they are most observant of that of *man*, or of the man with whom they have most to do—their master and rider. And their manner varies accordingly. Thus the military horse that carries the general sometimes shows conspicuously its *self-importance* by its haughty gait (Watson). Such is the force of discipline and habit, such the respect for rank in old regimental horses, that at trumpet-call they have been known to form themselves with precision into rank—led or commanded by the officers' chargers ('Animal World'). The recognition of distinctions of *human rank* is more familiar, however, in the case of the dog (Watson).

Wood tells us that the leader among deer, horses, and oxen 'will not suffer' certain things to be done 'without his permission, and resents the slightest interference with his *authority*.' His rule is more or less *despotic*; and it may be that, under the circumstances, despotic government is the only form of rule that has any chance of success. There is an equal danger in other animals, as in man, however, of the abuse of despotic power—in *tyranny*.

The love of *precedence* is sometimes strikingly exemplified among cows. Thus the case is given of an English cow that was 'the very personification of pride. . . . She claimed

precedence . . . . always went ahead of the herd. The best bit of pasture was her exclusive domain, on which no other durst intrude. . . . So far did she carry her pretensions that, if any other of the cows entered the byre before her, she would refuse to enter. . . . She would draw herself up and refuse to advance in spite of all encouraging words,' while 'her whole frame swelled with anger and offended dignity. . . . At last the cows within [the byre], as though conscious that they had forgotten their place, began to come out,' and then she, 'with an evident air of gratified pride, strode in in state.'[1]

The *necessity* that exists among many social animals for *government by a leader* is rendered obvious by the effects of the loss of a chief. What these results are in the case of the queen bee has already been pointed out. But similar results follow the absence, capture, or death of a leader among animals much higher in the zoological scale. Thus, in Eastern caravans, in the absence of the horse-leader, the camels, asses, mules, or other animals, become restless and uneasy; they stray from the path, and disorder reigns (Macgregor).

In every herd of camels there is a master bull, who, by his strength, 'keeps his younger brethren in subjection.' Colonel Warburton, in his celebrated 'Journey Across the Western Interior of Australia,'[2] describes how he suffered from the illness of one of these master bulls. Insubordination on the part of its juniors (camels) was the immediate result, each 'seeking an opportunity of asserting his own supremacy.'

The usual function of animal leaders seems to be that of a *protector*—to direct measures of defence in assault, of extrication or escape in danger. But there are other cases in which their duties are rather those of regulators of the civil, social, or domestic economy of the communities over which they preside. Thus Houzeau describes *mayors* of towns or villages among prairie dogs—mayors who grant audiences, receive visits as to administrative affairs—in short, discharge

[1] 'North British Daily Mail,' December 27, 1876.
[2] 1875, p. 213.

and regulate *public business*—and he tells us, moreover, that these governors or presidents of communities, occasionally at least, excel their fellows in size and strength as well as in force of character.

Whatever be the character or duties of an animal leader, whether he be military or civil, ruling during peace or called to the front by some great emergency, his *supremacy* is duly acknowledged by those whom he commands, as a general rule, so long as he can make good his claim to supremacy or show a proper title to obedience, deference, and respect. Whether the chief be a member of the same species, or belong to a different species or genus—whether he be man himself or some other animal—there is the same kind of subordination to a superior, of subjection to command and rule, of appreciation of superiority in the form of constituted *authority*. This sort of respect and obedience includes that which is shown in many cases by the young to parents or elders.

All this is the rule; but it is one that has frequent exceptions; for, as has already been seen, *rebellion* against constituted authority is far from uncommon. Such insubordination occurs in a variety of forms. For instance, there is frequently a refusal of obedience to man on the part of the dog, horse, elephant, or other animals that are usually submissive. Frequently, however, an obvious and intelligible reason is to be found for such disobedience either in ill-usage by man or in disease on the part of the animal. Thus rebellion against tyranny, oppression, injustice, or other forms of ill-usage is as legitimate, and even commendable, in other animals as in man—the pity being, in the case of other animals, that it is man too frequently who is their tyrant or oppressor, the cruel despot who has not the sense to consider even his own personal interests in the government of subject animals.

In the case of animal leaders of all kinds there is a distinct *specialisation* of duty, work, or business, a very decided division of labour. But this *division of labour*—this allocation of work or duty—occurs among the lower animals in a great many other, even more familiar forms. Thus it is

illustrated in the appointment from among members of a community of—

1. Sentinels, sentries, vedettes, outposts, patrols, guards, or watchmen of all kinds.

2. Soldiers, labourers, or artisans, nurses or foragers.

3. Different *ranks* of officers among their soldiers, including generals, aides-de-camp, and adjutants.

4. Delegates, ambassadors, or other forms of representatives or reporters, spies, scouts, commissioners, pioneers.

5. Officers of justice—including executioners, advocates, judges and jury.

6. Royal personages, with their officers or courtiers, bodyguard, and other attendants—

7. As well as in the relative duties or occupations of male and female parents, and—

8. In the appropriate and harmonious playing of its part by each individual of the group.

Such appointments imply, in certain cases at least, the assignation of a special duty to each of a group of animals, there being evidence further that there is frequently an adaptation of the special work to be performed to the special ability of a given individual to perform it.

Sentinels or guards are regularly posted at appropriate times and places by a large number of animals—including the prairie dog (Gillmore, Houzeau), wild horse (Watson), swan (Watson), cockatoo of Australia (Baden Powell), rooks (Watson), silver-eye (bird) of New Zealand (Buller), flamingo, shag, and many other birds ('Percy Anecdotes'), zebra (Baird), whistler marmot (Watson), common marmot (Wood), Californian quail as naturalised in New Zealand (Tinné), moufflon and other sheep (Youatt and Watson), Alpine marmot (Baird and Houzeau), certain monkeys (Cassell), Greenland and other seals (Cunningham), wild African cattle, bobac (Watson), chamois and other antelopes (Watson and Baker), guanaco (Darwin), Texan and other ants (Darwin, Huber, Figuier), certain wasps (Kirby, Spence, and Wood).

These guardians of the public safety are appointed usually for some of the following reasons, or under some of the following circumstances :—

1. At night, or during the sleep of the flock or herd, to guard against surprise.

2. During feeding, rest on a march, or pastimes.

3. In war, on the march or halt, in camp or bivouac—here also to prevent surprise.

It is their duty to sound or give the *alarm* on the approach of an enemy, or the threatening of any danger. If a sentinel fail in this duty, for instance, by being captured or destroyed before he can perform it, the capture of a whole herd may become easy. Thus the German Arctic Expedition inform us that Greenland seals 'set a watch before they go to sleep, which watch being killed, the whole herd may often be taken.' In such a case, however, it may be that the watchman is also a leader, in whose absence the same kind of helplessness from mental confusion and panic ensues as in the case of bees and some other animals.

In connection with the appointment of sentinels the following points have to be noticed:—

1. That, as in the case of leaders, the animals selected are almost invariably males.

2. That every advantage is taken of elevated ground commanding a view on all sides.

3. That the animal appointed is implicitly trusted by the rest; it has a specific duty to discharge, and it performs it conscientiously.

4. There must therefore be an appreciation of the different kinds of danger, as well as an idea of duty in relation to that danger.

Certain African antelopes place *sentries*—generally bulls—while they are grazing, and these sentries take up their posts on the summits of ant-hills, which form the only heights in certain parts of the plains of the Nile. Their occupancy of such watch-towers is, however, unfortunate or themselves in presence of the sportsman, to whom they thus readily become a marked prey (Baker).

Californian quails—as naturalised in New Zealand—'always keep a sentry perched on the stump of a neighbouring tree, to give them timely warning of the approach

of strangers' (Tinné). Ant *guards* open and shut gates and awaken sleepers (Huber).

Spies or *scouts* are employed by various animals, including the elephant (Watson and Houzeau) and the wild horse, the swallow ('Percy Anecdotes') and the *loxia* (another bird) (Pierquin), and the ant (Figuier). These scouts have to make investigations and reports; in the case of the elephant, for instance, they have to look out for pitfalls (Houzeau). Hence it is that, as in the case of sentinels, old, experienced, sagacious, cautious, observant animals are selected.

Illustrations of a very different kind of successful *playing a part* are to be found in the various performances of trained animals in the theatrical, musical, or other exhibitions in which dogs, cats, pigs, horses, and various birds, such as the canary, goldfinch, and linnet, are among the artists.

Some of the best illustrations of an adapted division of labour occur in connection with the important phenomena of *co-operation*—of preconcerted action for a common end or object. In a great variety of ways many of the lower animals recognise and act upon the principle that *union* is, or gives, strength. They form combinations, associations, or alliances, temporary or permanent, for a great number of very specific purposes. They co-operate willingly, intelligently, and successfully not only with each other but with man. One of the most obvious effects of union is the inspiration of *courage* and confidence, the ability to dare and do, in behalf of themselves or their young, things that they would never attempt in their individual capacities. Even timid sheep, in combination in a body, and under a leader, do boldly what they would never do individually—face a dog, for instance, or even chase it ignominiously from a field or pasture. The meek cow and many gentle, peace-loving birds are capable of the same feats of courage under similar circumstances.

The simplest forms of *co-operation* with each other are those in which only two individuals are engaged, though these two frequently belong to different species, genera, and even orders or classes. And in such cases the assignation by mutual agreement after consultation of a special duty to

each of the confederates is frequently at once obvious and successful. Thus Wood tells us of a dog and raven literally hunting in couples, the bird acting as driver of the game—a hare—out of the heather into the open, the dog then pursuing. A rat, in order to convey a potato to the general store or nest, 'stretched himself on his back on the floor, placed the potato on his chest, and kept it firmly there with his paws. Whereupon his companion placed his tail in the former's mouth and dragged him along to a hole that was in the floor. There they let down the potato and followed after it themselves' (Stewart). Nor is this an uncommon instance of one animal playing the part of a cart or wheelbarrow, while another enacts the horse. In the Alpine marmot, for instance, we are told that while certain individuals act as reapers, collectors, and porters, others make themselves useful as waggons and horses ('Percy Anecdotes').

We know that various baboons and other apes, spider and other monkeys, make chains, suspension *bridges*, and *ladders*, of their own bodies, by joining hands or clinging to each other by various concatenations of paws and tails (Ulloa, Cassell)—bridges that are used in crossing rivers. And, though not quite in the same way, what is virtually the same thing is done by bees (Rendu) and ants, so that on bridges composed of the bodies of the latter—voluntarily sacrificed for the purpose—whole armies of their fellows sometimes cross rivers or streams.

A certain dog and cat were confederates in a larder theft. The cat by its mewing called the dog when circumstances were favourable—the coast clear—for their depredations. On one occasion the dog was followed, and the cat was found, who, 'mounted on a shelf, and keeping with one foot the cover of a dish partly open, was throwing down to him with the disengaged paw' some enjoyable good things ('Animal World').

Prairie wolves, which, like many other animals, hunt their prey in pairs, in attacking the bison make the following arrangement:—One makes a feint at the bison's head while the other hamstrings him. And inasmuch as the post of honour, as of danger, is the rear assault, it is entrusted to the most experienced, bravest animal (Gillmore).

Two tame ravens plundered a bird trap—the one lifting up the lid, the other removing the captured bird (Wood). In another case a wolf drove a herd of gazelles to a ravine in which two of its comrades were concealed in ambush. In a third instance different posts as to the locality to be occupied were allotted to each of a pack of six wolves that co-operated to entrap a herd of Indian antelopes.

Co-operation on a large scale—on the part of large numbers of individuals, whether of the same or of different species and genera—includes the convention, at special times and places, of convocations, conferences, congregations, or assemblies for the following or other specific ends:—

1. *Judicial*—for the trial and punishment of offenders.
2. *Military*—for the holding of councils of war.
3. *Recreational*—for the celebration of pastimes, sports, or games of various kinds.
4. *Migrational*—for conference as to the time and manner of migration.
5. *Defensive*—for mutual protection, security or safety.
6. *Industrial*—for the repair of damage to public property.
7. *Marauding*—for the acquisition of plunder or booty.
8. *Food-seeking* or foraging.
9. *Emigration* and colonisation.
10. *Nuptial*—for courtship and marriage.
11. *Hybernation.*
12. *Criminal*—as for theft.
13. The *rescue* of their fellows from captivity or danger.

One of the most interesting features of co-operation among the lower animals is *rotation of duty or privilege*—the taking by turn work, food, or drink. In drinking, various sand-grouse of South Africa (species of *Pterocles* and *Pterochurus*) 'do not rush simultaneously to the pool, but each one waits its turn, the first comers having the precedence.' The same is the case with the pintado or wild Guinea fowl of Damara and Namaqua Land, the large flocks of which, on approaching water, 'go to work most systematically,' so that all may have in turn access (Andersson). In the same way wild geese and ducks, starlings and other birds, take turns

in feeding, those in the rear flying to the front in succession, so that all may have a fair and equal chance of food-supply.

Dog-hyænas, when hunting in packs South African antelopes, relieve each other when fatigued, 'the leading hounds falling to the rear . . . . when others, who have been husbanding their strength, come up,' according to Gordon Cumming. On a similar principle *relays* as well as *reserves* are used in various kinds of work—military or other—so as to avoid the exhaustion of important individuals and allow suitable intervals of rest and refreshment. Among foraging and leaf-cutting ants there are regular relays of porters in conveying food (Belt). Parent woodpeckers take their turn at work, the resting one singing to the labouring mate by way of encouragement or as an expression of love. In war *reinforcements* are kept in readiness, sought or ordered, and sent, implying an understanding that aid is, or may be, needed, and of what kind, in what way, at what time and place, and for what reason or object.

Another pleasing feature connected with unity of action in the lower animals is that they have the good sense and good feeling—by no means always present in the case of 'superior' man—before a common enemy, or in presence of a common danger, or for a common good, to forget or thrust aside all their individual, family, caste, clan, or tribal quarrels or feuds of all kinds. Here again, as in so many other cases, they feel that their safety—it may be their very existence—depends on that strength, that bold front which the union of numbers gives; and however ready they are at other times to give vent to their petty passions and express their individual animosities, they recognise the inexpediency or impropriety of doing so at a time when all effort requires to be concentrated in one direction. Ravens forget their individual hates over a common prey, so that they consent to share booty even with their enemies. There is no rancour, grudge, or temper shown if the food-supply be abundant (Watson).

The making of *common cause* often depends upon what is entitled to be considered a veritable *esprit de corps*—for

instance, in the case of the street dogs of Constantinople, whose clans, castes, factions, or tribes resemble in many respects the human clans among the Scotch Highlanders prior to, and even during, the eighteenth century. Among these Eastern dogs of the present day 'hostile factions' fight out their feuds at night, when the streets are deserted by mankind. But an 'injury, however well deserved, inflicted upon an individual is taken up with great *esprit de corps* as a common cause by a whole clan.'

As in man, *specialisation* of work has its *disadvantages*. Thus Hogg, the Ettrick Shepherd, says, 'An exceedingly good sheep-dog attends to nothing else but that particular branch of business to which he is bred. His whole capacity is exerted and exhausted on it.' One result of this is, that though he may do the one thing well, 'he is of little avail in miscellaneous matters, whereas a very indifferent cur bred about the house and accustomed to assist in everything will often put the more noble breed to disgrace in those paltry services.' In other words, the nondescript or mongrel cur, untrained hanger-on, is really more 'generally useful,' both to itself and to man, than the highly-bred, specially-trained collie—a fact calculated to be comforting to human as well as animal mediocrity.

Co-operation with man is more or less familiar in the case of the dog, horse, ass, mule, elephant, cow, monkey, fishing cormorant, falcon, and a host of other animals that minister to his comforts or pleasures. These animals become man's *confederates*, accomplices, partners, associates—for instance, in—

1. Various industrial or other labours, such as—
   - *a*. Dragging or drawing the plough, cart, or carriage.
   - *b*. Acting as beasts of burden, or—
   - *c*. As riding animals.
2. Various forms of *crime*—such as—
   - *a*. Theft of all kinds—from shop-lifting, sheep-stealing, poaching, brigandage, burglary, smuggling, up to highway robbery.
   - *b*. Murder.

3. The detection of human crime—such as theft, robbery, and murder.

4. Life-saving in shipwreck and otherwise.

5. Man's sports—the race and chase especially, but even cricket and other games.

6. Human wars—as in the case of military elephants, horses, oxen, and dogs.

7. Man's judicial or other forms of punishment of fellow-man.

Successful co-operation with man implies—

1. A knowledge of man's—
   - *a.* Object.
   - *b.* Language; and the—
   - *c.* Means by which he is endeavouring to effect an object.
2. An appreciation of the nature of the occupations in which they are conjointly engaged—including their *criminality* or illegality.
3. A consciousness of the importance or value of their own *share* in the joint labour—of the part they are called upon to play—including a feeling of pride or honour at being called upon or permitted to give aid or service to man, a sense of participancy in his pursuits, schemes, intrigues, sports.
4. An estimation of success and failure, with their personal bearings or results.
5. A distinct conception of duty, with fidelity, intelligence, perseverance in its discharge.

The *want of co-operation* with each other, or with man, at the proper time, and when circumstances call for it, is productive of the same kind of results that occur in man—viz. confusion, panic, defeat, and loss of life or property. This is specially observable when organised and unorganised bodies come into collision—the one, though small, putting to rout the other, though large, in numbers. Thus the compact charge of a few men on bison herds creates immediate confusion, panic, and flight in the latter (Houzeau).

Frustration or failure of the best intended and best con-

ceived efforts for an animal's good is the common result of its non-cooperation, for instance, with man; and this non-co-operation is the natural fruit of a non-understanding or a misunderstanding of man's object. Without intelligent understanding on an animal's part of the object aimed at there can be no confidence in the person offering an assistance that is not requested, however much it may be required; and without complete confidence in the operator or co-operator there can obviously be no hearty and efficient co-operation.

CHAPTER XXII.

LAW AND PUNISHMENT.

THOUGH they have not the means that man possesses of giving them form in print or writing, or even of giving them expression orally, certain animals, nevertheless, have *laws* that regulate their conduct, rules established by authority and custom—sometimes of a very definite kind—that guide their procedure under given circumstances. Authors have described even the existence of systems or codes of laws or of rules among various animals, and have professed their ability to understand or interpret them. Thus Mrs. Burton says of the pariah dogs of Damascus, 'Their habits are regulated by laws of their own. I have grown, in the solitude of Salahiyeh, to learn them.' Animals assert or maintain, defend and transgress, their own laws, and they suffer the penalties of such transgression.

The following are illustrations of the *kinds* of law or rule that guide the actions, individual or corporate, of certain of the lower animals: viz. those relating to—

1. The administration of public affairs in the villages or communities of the prairie dog (Houzeau).

2. Territorial or district government—including frontier laws—in the street dogs of Constantinople, Damascus, or other Eastern towns (Burton, Low, Watson).

3. The common laws for the common good that characterise wasps (Rendu).

4. The laws of battle among various belligerent species or genera.

5. The law or rule of might—of the strong over the weak.

6. The law or rule of right.

7. That of constituted authority, which may or may not involve that of might and right, either or both.

8. Laws of etiquette—including those regulating precedence.

9. Lynch law—the administration of punishment for offences without any form of trial.

10. Possession.

Hence some animals may be described as possessing what are virtually national, provincial, territorial, proprietary, public, domestic, communal, military, civil, criminal, social, conjugal, moral, or other laws.

What may well be called the law of *might*, the rule of the strongest, prevails throughout the animal kingdom—including man. The dominance of the powerful over the weak, of tyranny or bullyism, is everywhere common. But mere physical or corporeal strength does not necessarily or always prevail *per se*. In animals that occupy positions of command or authority, physical is usually associated with *mental* superiority; and mental acumen in the weak—the ingenious expedients to which superior sagacity gives rise—may, and frequently do, outmatch mere physical force. Thus the huge Newfoundland dog succumbs sometimes to the address and adroitness of the puny ape, which makes a beast of burden of it, and rides on its back commandingly, as man does on the horse (Houzeau).

Right, however, is respected as well as might, though it is also invaded, and has to be defended. The following are illustrations of the vested rights of animals as recognised by each other, viz. those relating to—

1. *Property* of all kinds, including—
   - *a.* Food, prey, booty.
   - *b.* Nests or other forms of abode.
   - *c.* Young or eggs.
   - *d.* Marriageable or married females.
   - *e.* Beats, districts, hunting-grounds, quarters, or boundaries.
   - *f.* Trappings or insignia of office.
   - *g.* Slaves or servants.

h. Other forms or kinds of property.

2. Rank or status, with its accompanying respect or deference.

They may therefore be said to have rights conjugal, territorial, proprietary, parental, filial, which they are called upon to assert and maintain, and which they also usurp or infringe. Such rights, as in man, are individual or corporate; they form the subject of dispute and struggle.

Wrongs are equally admitted and redressed in certain cases, whether they relate to individuals or communities.

For all kinds of constituted *authority* various animals have respect, and they show it by their obedience in certain cases, while they mutiny or rebel against it in others. Some of them have systems or forms of *government*—including the

1. Monarchical in the bee.

2. Republican, communal, or communistic in ants.

3. Patriarchal—that of leaders or chiefs in the wild horse, ass, and elephant.

4. Parental—in dogs, cats, monkeys and apes, and many other animals.

5. Domestic—in monogamous animals.

6. Social.

The dog and other animals may be trained to respect the authority or supremacy of *man*, to obey his laws—that is, the rules, unwritten, unprinted, even unspoken frequently, that he lays down nevertheless for their guidance. These laws are understood, and evaded or infringed, when they are not obeyed. To the dog, horse, elephant, and other tame or domestic animals, indeed, man's will may be said to be their *law*. They recognise him as their *lawgiver*, and soon learn to distinguish what is forbidden from what is permitted by him. Not only so, but certain animals are trained to act efficiently as *administrators of man's laws*, as his *police*, or his executioners. Thus elephant and dog police or executioners have been taught to capture runaways or deserters, whether these are ponies, sheep, or men, and to punish them summarily—in the case of man by crushing to death or throttling (Watson).

Wood asserts that the laws of precedence and *etiquette*

among cows are 'as clearly defined as those of any European Court. Every cow knows her own place and keeps it. She will not condescend to take a lower, and would not be allowed to take a higher.' We know, moreover, that military horses and elephants are great sticklers for *rank*, insisting on occupying that place in processions or pageants to which they believe their own rank or that of their riders entitles them.

One of the evidences commonly adduced of the *reign of law* among the lower animals, as in man, is the fact that certain birds at least have what are, or what appear to be, regular *judicial proceedings*, regular trials by judge and before jury of culprits against law. Illustrations of such trials are to be found in the absurdly so-called 'parliaments' of rooks, crows, or other birds.

The various authors who have described them, and who profess to be able to interpret the curious phenomena, speak of the vast assemblages of birds of the same species at some given point and at some given time, the birds coming from all points of the compass. In the centre is placed a prisoner; his aspect, look, attitude, point him out frequently as, in his own estimation, a culprit. Advocates address the audience; there are even pleadings, consultations, and deliberations. At last a judgment is come to, sentence is passed, and popular as well as judicial vengeance is inflicted with wonderful unanimity and co-operation. The whole stages of the procedure, in fact, resemble in miniature and in pantomime those of our own law courts. Hence some authors speak of such assemblies as 'courts,' and the natives of India describe certain gatherings of the Indian crow as of this character.

In these courts or parliaments of the Indian crow the birds form a ring around one individual, 'who appears to have been an offender against some of the rules of their society.' Then he is attacked suddenly by five or six of his fellows, 'pecking at him and striking at him with their wings' (Wood).

Crow parliaments in Shetland have been described by Edmonstone and Saxby, who, however, differently interpret the facts observed, while the facts themselves are not the

same as noted by these competent naturalists. In all such narratives it may be difficult, but it is necessary, to separate *Fact from inference or interpretation.* According to Edmonstone, the *facts* are—that there is an assemblage of large numbers of the same species; that there are certain noisy proceedings; that one or two individuals are put to death by the mass of their fellows; and that then there is a quiet breaking up of the congregation. The *conclusions*, which may or may not be correct, are, that there is trial by jury of a criminal, characterised by formal legal procedure, and followed directly by what is considered suitable—that is usually capital—punishment.

Dr. Saxby, on the other hand, also of Shetland, the brother-in-law of Dr. Edmonstone, and the author, moreover, of a volume on the 'Birds of Shetland,' takes quite a different view of the character of the 'craa's court' of the hooded crow, in spring, in these northern islands. He professes to have seen 'nothing particularly worthy of mention, with the exception of occasional shortlived squabble, such as is constantly occurring in any large flock of birds.' And he adds, 'I believe, however, that a considerable amount of courting takes place at these meetings, having noticed that pairing takes place very soon after the dispersal of the flock.'

The probability is that Edmonstone and Saxby, Houzeau, Wood, and the other authors who have described such courts or parliaments, have in some cases described very different kinds of assemblies. There is every reason for believing a few to be judicial, others to be amatory or nuptial, while, as regards the character of some, it has been shown in the chapter on 'Unexplained Phenomena,' that at present we know nothing satisfactory.

Wood describes rook parliaments. 'In the middle' of the assemblage in one case 'was one bird looking very downcast and wretched. Two more rooks took their place at its side, and then a vast amount of chattering went on.' Ultimately, the unfortunate central bird was pecked nearly to pieces and left mangled and helpless on the ground. In such a case we are led to infer, though our conclusion may

be erroneous, that we have to deal with an accused, convicted, condemned criminal; official accusers; and the summary execution of a judicial sentence. Marcgrave long ago described such assemblies of rooks, with their addresses and debates, but his account has probably been regarded, as so many of such narratives are, apocryphal.

The stork, too, is represented by Watson as having, or holding, trial by jury, public conventions at which harangues or speeches are delivered, accusations made, defences offered, by public orators and other officials, while the mass of the audience takes a lively interest in the proceedings. Consultations are held, sentence is pronounced, and capital punishment inflicted for such supposed crimes as the hatching of a gosling. The sparrow is another bird that administers public punishment to offenders after holding general councils, the proceedings of which are marked by much agitation, tumult, and clamour (Watson).

The *public trial* of a prisoner before a public court by the aid of advocates has also been mentioned as occurring among Barbary apes (Cassell).

All such incidents, so far as they are authentic, furnish illustrations of *public punishment* for public misdemeanour. But punishment of animals by each other has not always or generally this *public* character. Usually it is private, and of an individual by an individual, as in the correction of the young by parents. It may be said to have a public character in those not uncommon cases in which a number of individuals—usually, but not necessarily, of the same species—co-operate for the destruction or persecution of a *common enemy* —a case in which any one of the co-operating individuals would have no power of inflicting punishment.

The *grounds* on which animals inflict punishment on each other include the following:—

I. In *young*—

1. Ignorance, inexperience, stupidity, awkwardness.
2. Forwardness, impudence, or impertinence.
3. Refractoriness.
4. Theft.

5. Various forms of ill-temper.
6. Want of filial deference.
7. Mischievousness.
8. All kinds of annoyance.
9. All faults of omission or commission.

II. In *adults*—

10. Errors of all kinds.
11. Conjugal or other erotic offences.
12. Rivalry.
13. Cowardice or faintheartedness.
14. Transgressions of laws of all kinds, including all forms of crime.
15. Idleness or laziness—including the shirking of work or duty.
16. Malingering.
17. All invasion of rights or privileges.
18. Straggling or wandering.
19. All rebellion against constituted authority.
20. All forms of troublesomeness.

Punishment of the *young* especially has frequently an educational and salutary object or character, its *aim* being the correction of bad habits of all kinds, and of the errors naturally incident to inexperience, ignorance, thoughtlessness, and exuberance of feeling.

The modes, means, or *forms* of punishment adopted are as various as the causes or reasons for punishment. Thus they include—

1. Capital punishments of various kinds—the summary destruction of life by—
   a. Pecking to death by birds.
   b. Buffeting—also by birds.
   c. Worrying by dogs.
   d. Precipitation.
   e. Drowning.
   f. Stinging.
2. Banishment or outlawry, as in 'rogue' elephants; deposition, or other forms of disgrace.
3. Corporal chastisement, by—
   a. Blows or cuffs.

b. Bites.
c. Kicks.
d. Pinching.
e. Shaking.

4. Artificial fright—as by pretended drowning or worrying—a ruse sometimes resorted to by big dogs to punish the troublesomeness of little ones.

5. Simple reprimand, rebuke, reproof, by voice-sound, look, or otherwise.

6. Persecution—long persisted in and unremitting.

7. Practical jokes—sometimes of a very cruel kind.

8. Simple repression of liberties—the snubbing or putting down of all kinds of presumption.

9. Threatening or pretending this or that form of violence to the person.

A few illustrations of these conjoint grounds and modes of punishment are desirable. A big dog, after rescuing a little one from drowning, 'cuffed it first with one paw, and then with the other' (Wood). The cat, too, cuffs with its paws the kitten that is forward, impudent, lazy, or stupid; while the dog-parent treats its pup under similar circumstances with a bite or a growl. Of dogs in the East, a correspondent of the 'Animal World' says: 'If a dog in the interior of the city makes himself disagreeable, he is taken up by the scruff of the neck and carried outside the city. He is never known to return to his old haunts. In fact he is unable to do so, being always hindered by those in possession of the intervening districts from passing through them. He thus remains on the outside of the city, an *outcast* from the dog community, a pariah among dogs, for the rest of his days.' A certain dog punished a companion for sheep-worrying (Watson), and other dogs punish their fellows for such offences—negative or positive—as malingering, shirking work, theft, and provocation or annoyance of all kinds.

Dogs in the East punish stragglers from their own proper territory (Low). Large powerful dogs frequently correct the troublesomeness of small weak ones by temporary submersion in water, to all degrees short of drowning; this

being selected perhaps as the most effectual means, the most dreaded kind, of punishment (Watson).

Baboons chastise their young for impudence or want of deference (Cassell). The Rhesus monkey indulges in a practical joke of a diabolical kind. Having caught one of a flock of crows that have been annoying it by pilfering its food or otherwise, it plucks the poor animal alive, and then leaves it to be pecked to death by its own fellow-birds. The Titi monkey, on the other hand, gives its companion against whom it has a grudge a ducking (Cassell). The leader of a band or troop of apes punished a female for decoying or seducing the males (Pierquin). A young baboon had been annoying an old one by pulling his tail. The old one suddenly turned upon his tormentor, chastised him with cuffs or blows, and finally threw the shrieking delinquent over his shoulder and bore him away (Drayson).

In troops of wild horses stragglers on the march are punished by the adjutants ('Percy Anecdotes'). Elephants both threaten and punish the idle and stupid ('Animal World'). A fox chastises another for its stupidity in missing its chance of securing prey (Watson). Bulls punish cows for transgressing boundary lines (Watson).

The cock inflicts vengeance on his hen for conjugal infidelity—real or supposed. Thus he punishes her for hatching other eggs than her own, though these alien eggs may have been substituted for her own by man for experimental or other purposes. She may have committed a simple error of observation in not distinguishing other eggs from her own. Hers may be the mere stupidity of ignorant innocence; while he commits a more serious error of inference, suspicion, and jealousy—assuming criminality where there is none, judging from first and false appearances, rushing hastily to a conclusion without either inquiry or reflection.

If a female Patagonian penguin lets her egg fall, 'the male bird chastises her without pity' (Pouchet), apparently for her stupidity or awkwardness. Conjugal offences are frequently committed by birds—such as the cock, stork, turkey,

pigeon, and magpie—and they are sometimes summarily punished, as in the case of a male magpie, whose mate had consorted with a stranger male (Watson). A grey lag goose, whose mate had been killed by a dog, revenged herself upon the latter by a course of persistent persecution, subjecting it to incessant worry. Even beetles punish each other by thumping and thrashing (Wallace). Kites found in a state of alcoholic intoxication either lose caste among their fellows or are unmercifully pecked to death by them (White). A queen hive bee 'having laid only drone or male eggs, was stung to death by the workers, who cast her body out of the hive' (Carpenter).

While animals frequently and freely punish each other for a great variety of offences and in a great variety of ways, in certain cases they also punish *man* himself, usually in revenge for some piece of cruelty, but also occasionally for man's crimes against his fellow-man. Thus a male swan, once resident in St. James's Park, London, a great favourite of Queen Charlotte's, seized a boy that had been teasing it 'by the leg of his trousers, and dragged him into the water up to his knees' ('Chambers's Journal'). On the other hand, dogs and cats occasionally attempt the *murder* of a master's murderers, and in other practical and dangerous ways they resent injury inflicted on those whom they love. In the one case we have retaliation for, or repayment of, annoyance or ill-usage; in the other, the fruit of love, the repayment of kindly usage by fierce attack on a human aggressor.

Many animals, especially young ones, feel that they *deserve* the punishment inflicted, and punishment is usually *proportionate* to the offence and suitable to the age and character of the offender. Thus the large powerful dog contents itself with merely frightening the small cur that annoys it by snapping or snarling about its heels. The huge Newfoundland or mastiff gives its little tormentor a good shake, a bite, or a growl, or perchance a worrying or a ducking in or under water. Nay, much though punishment may be deserved by such a tormentor, the animal that has been tormented not unfrequently shows its *magnanimity* by

refraining from punishment. Apparently such animals hold, with magnanimous authors vexed by contemptible critics, or at least they act upon the principle, that

> The noblest answer unto such
> Is *kindly silence* when they brawl.

The elephant is satisfied with different degrees of vengeance according to the nature of the provocation; in other words, its placability depends upon the kind and amount of annoyance or ill-usage to which it has been subjected. On the other hand, punishment is sometimes inordinate, *disproportionate*, unsuitable, and it is apt to be so wherever the passions are unduly excited, whenever the desire for revenge, exasperation, despair, bereavement, fear, or other feelings gain an ascendancy and hurry on to precipitate action. In such cases punishment is apt to be characterised by its fury, pitilessness, mercilessness, by its not stopping short of the death of the victim, and even by indignities to its murdered body.

For instance, when hens attack the sparrow-hawk, more than mere deterrent or corrective punishment is aimed at or involved (White). The long-suffering fowls give vent to long pent-up irritation; they visit upon their victim their hereditary or ancestral, as well as their individual, hostility and vengeance. This leads to the remark that, as in man, the *innocent* frequently suffer for the misdeeds of the guilty. The unoffending young of a species or genus, some individual of which may have committed a serious misdemeanour, or whose individuals are natural enemies, and are habitually committing faults of aggression, suffer for the misdeeds of their ancestry, parents, species, or genus.

The particular form of punishment adopted sometimes shows much *ingenuity* in the adaptation of means to ends, and this ingenuity may take the shape of a very refined *cruelty*. Thus Watson tells us of the blockade of a usurping sparrow by a company of swallows. Such an incident illustrates the frequency and efficiency of *co-operation* or combination for the purpose of punishing an enemy.

A sparrow having taken possession of a marten's nest,

the dislodged martin collected thirty or forty of its fellows, who dragged out the intruder, took him to a certain grass-plot, and there killed him. And similar co-operation in similar kinds of punishment is common in dealing with bird intruders. The basis of such co-operation is a feeling of inability singly to punish an offender, and a knowledge that union gives strength as well as courage, and can effect readily what individual effort could never hope to achieve.

In certain cases a weak animal, instead of seeking the aid of a number of its fellows, contents itself by soliciting the good offices of one—a sufficiently powerful and brave one—to act efficiently as its own substitute in the execution of vengeance. And small dogs, for instance, sometimes show great sagacity in their selection of a champion, and take great pains to procure him, travelling long distances for the purpose.

In such cases the animal selected appears to accept the office pressed upon it, travels with its oppressed companion to the residence of the bully who has ill-used that companion, discharges its duty of severely punishing the tyrant—perhaps by throttling or worrying him to death—and then goes its way to its home, having received, we cannot doubt, the thanks of the befriended animal.

CHAPTER XXIII.

USE OF NATURAL INSTRUMENTS.

AMONG the many supposed points of difference between man and other animals is his use of tools and weapons, of instruments of all kinds. But such a belief and such an allegation are the obvious errors of thoughtlessness, for very little consideration is required to show that the lower animals, or at least many of them, employ—

1. Their own bodies, or portions or members thereof, as natural instruments, as tools or weapons, as the case may be.

2. Certain natural objects to which they have access—for instance, sticks and stones.

3. Both the natural instruments of their own bodies or the members thereof, and other natural objects—as tools or weapons—*in the most effective way.*

4. They select, however, the *most suitable* natural instruments for their special purposes.

5. They maintain all such instruments in good *working order*, or render them suitable for special uses.

6. Further, they are acquainted with the applications of many of the instruments constructed and used by man, and they behave in accordance with this knowledge.

7. They also use these instruments themselves, and in the same way that man does.

8. They substitute those of man for their own natural instruments when they find the former at once more accessible, more convenient, and more effective.

9. They use more than one instrument at the same time, the one supplementing or assisting the other.

It will appear in the sequel that certain animals may be

said to be tool- or weapon-*makers*, just as they are indubitably tool- or weapon-*users*. They may surely be said so far to form their own tools or weapons when they break off portions of the stems or branches of trees, stripping the foliage or not, as may be desirable, so as to form sticks, cudgels, or clubs, fans or whisks, sunshades, bedclothes, or huts, or when the chimpanzee constructs a drum out of a piece of dead wood (Houzeau).

In the first place, then, many of the lower animals use either their whole bodies or portions of them—such as the back, shoulder, arms and legs, fingers, toes, or claws, hands, paws, hoofs or feet, cheeks, mouth, jaws or teeth, beaks or bills, nose, proboscis, mandibles or antennæ, heads or horns, spines, fins or flippers, tails or wings, spurs or other appendages—either as tools or weapons, as circumstances may require.

The Quadrumana use their *arms* in a very humanlike fashion in the carrying about of their infants, and in various kinds of *embrace*. The anthropoid apes carry their infants either in their arms, after the usual European fashion, or perch them upon their backs or shoulders—the latter being customary to this day among Egyptian women, as I have myself seen. The orang-utan swims with its infant perched on one shoulder, using one of its arms and hands to hold the infant in position (Pierquin). Baboons and other apes carry their young on their backs (Houzeau)—an operation that requires the use of the arm both of mother and child. Diana monkeys carry each other on their backs (Cassell). The soko (Livingstone), ouistiti monkey, and various apes (Houzeau) and monkeys (Miss Gordon Cumming) carry their young in front of the chest, as human mothers or nurses do, and fondle or 'dandle' them in the same way. Miss Gordon Cumming tells us of monkeys in India 'nursing their babies as tenderly as a woman . . . . sometimes carrying a baby in each arm,' or the babies were seen 'sitting on their (mothers') backs, with their little arms round the parental necks.' They sometimes also run on all fours, 'with the baby slung below and grasping the parental body. Sometimes the young one sits on the shoulder or astride on

the back. In short, whatever attitudes human beings could devise seem to come quite naturally to these absurd creatures.' The artist of the 'Graphic' who accompanied the Prince of Wales in his Indian journey in 1875–76, describing the tame and sacred Durga monkeys of the Temple of Benares, represents the mother monkeys as there 'running about with their babies clasped tightly to their breasts;'[1] and the anthropoid apes in the same way strain their infants to their breasts. The chimpanzee carries its young in its arms (Houzeau).

In the same way, moreover, in which they carry about and nurse or fondle their own young, various of the Quadrumana carry about and nurse or fondle *human infants* as well as various animal pets. Thus Berkeley tells us of a monkey that carried a human child companion in its arms, though it carried the poor child by tucking him under its arm, head downwards, and so taking him for air to the roof. The 'Animal World' mentions a tame baboon carrying a dog in the same way. Livingstone reports that the soko carries in its arms the children of kidnapped natives.

We have seen that certain of the Quadrumana use their arms in the caressing or embracing of their young. They do so also in embracing each other, whether the *embrace* be an expression of mutual or marital affection or the grip or hug of the wrestler in jest or earnest. They frequently hug or embrace their mates—wives or husbands—just as human beings do in civilised society. Thus the orang-utan uses its arms for embracing its mate (Cassell). The soko grapples with man (Livingstone), and apes grip each other in wrestling, just as our Cumberland or Westmoreland men do. Baboons embrace their young (Houzeau). Bartlett speaks of the mutual embraces of the chimpanzee; Cassell of hugging or embracing each other in the siamang and the tocque monkey; and various other monkeys or apes *caress* each other by circling the arms round the neck. A male siamang also embraced its master (Cassell).

The Quadrumana use their *hands* for many of the same purposes to which man applies them; for instance—

[1] 'Graphic,' January 5, 1876, p. 123.

1. In greeting, by offering and shaking hands.

2. In expressing grief or distress, by the wringing together of their own hands; or anger, by rubbing them together.

3. In giving blows or fisticuffs with the hand clenched.

4. In using the closed fist threateningly, or in passion; or—

5. In waving or warning off—the hand being either open or shut.

6. In the use of natural weapons—such as sticks, fruits, or stones—as missiles or otherwise, or of instruments such as drumsticks.

7. In the use of man's instruments—such as oars, pump-handles, jugs or pots, ropes, brooms or besoms, pestle and mortar.

8. In shading their eyes from the sun.

9. In using the hollowed hand as a drinking vessel.

10. In warming their outspread hands before a fire.

11. In washing their own faces or hands, or those of their young.

12. In making beds.

13. In receiving food or other gifts.

Various apes and monkeys *shake hands* with men, frequently taking the initiative by offering their hands first (Lady Verney). A young, and necessarily wild, soko 'held out her hand to be shaken' (Livingstone). The chimpanzee presents its hand in greeting or thanksgiving (Houzeau). The lori exhibits its attachment to man by squeezing his fingers (Cassell), and various monkeys or apes do the same.

The closed or clenched *fist* is used in boxing with each other or with man, in chastising each other, in defiance, threatening, or passion. The orang-utan uses its fists as weapons both of offence and defence (Cassell). Various apes punish each other by fist blows (Pierquin). The soko slaps the cheek of the native whom it attacks, beats off intruders with its fists and yells, and an attempted abduction of a female leads all his companions to box and bite the abductor (Livingstone). The great chacma baboon fisticuffs its young for practical irreverential jokes, such as pulling its tail

(Drayson). A young soko, 'on being interfered with by a man . . . . tried to beat him with her hands' (Livingstone). A chimpanzee in the Zoological Gardens of London boxes with its keeper—in sport, no doubt.[1] Monkeys in New Guinea shake their fists in defiance (Lawson). The orang beats the ground with its fists when in passion (Yvan).

The collared *callithrix* monkey *rubs* its hands in anger (Cassell). *Wringing* the hands in certain monkeys, as in man, is an expression of anguish. A young soko 'wrings her hands quite naturally, as if in despair' (Livingstone). The sacred Durga monkeys of Benares 'hold out their hands for food;'[2] in other words, adopt this means of *begging*. The chimpanzee uses its hand, as man does, to wave or warn off intruders (Houzeau). A young soko 'holds out her hand for people to lift her up and carry her, quite like a spoiled child' (Livingstone).

The siamang mother *washes* her young (Cassell); while of the gibbon Duvancel asserts that he has seen the 'mothers carry their young ones to the water and wash their faces' (Büchner). The titi monkey washes its hands as man does (Cassell). The chimpanzee washes its own hands and face (Houzeau). A young soko 'wipes her face with a leaf' (Livingstone).

Many monkeys and apes make use of *missiles*, throwing stones or pieces of rock, fruits or sticks, or other accessible movables. Baboons throw showers of stones (Cassell). The orang-utan uses fruits and branches (Wallace). The Rhesus, coaita, and other monkeys throw stones in retaliation or otherwise (Cassell).

Some wield sticks as cudgels or clubs, as *weapons* of offence or defence—for instance, the gorilla and chimpanzee (Cassell). A cebus (monkey) of Belt's, in order to catch ducks, held out a piece of bread with one hand, and when it had tempted one of the birds within reach, seized it with the other, itself swinging meanwhile from a verandah by its chain. An ouapavi (monkey) brushed its own clothes and shoes (Cassell). The monkeys of Darfur (Africa) cling to

[1] 'Graphic,' August 28, 1875, p. 199.
[2] *Ibid.*, January 5, 1876, p. 123.

each other, hand in hand, when purposely intoxicated, in order to their capture, by man. Baboons cuff or skelp their young (Cassell).

In many of the operations involving the use of the arms and hands the employment of the *fingers* and *thumbs* is also implied. But there are many operations in which, among the Quadrumana, the nicely adjusted use of the fingers and thumbs, and even the *nails*, is as much required as in many of the works of man. These operations include—

1. The picking out of vermin—such as *pediculi*—from the hair and skin of various parts of the body.
2. The picking up of pins or other very small articles.
3. The undoing, untying, or uncoiling of knots in cord, string, rope, rings or links in chains; including also the picking out of thread in sewn articles, as well as the tying of knots.
4. The use of keys or other instruments of man's—such as table utensils.
5. The picking of pockets and other forms of theft.
6. The prizing open of lids of boxes of all kinds.
7. Turning over the pages of books.
8. Doing or undoing the fastenings of articles of man's dress—such as boots.
9. Hairdressing.
10. Extracting nails, staples, or holdfasts.

As *pickpockets*, many monkeys may well be termed 'light-fingered,' and in other ways they prove themselves adroit *thieves*, mainly by the use of their fingers. The titi monkey theftuously removes cabinet specimens of insects from the pins by which they are fastened (Cassell). The mona monkey opens locks, unties knots, and undoes rings (Cassell). The orang-utan also unties knots in a chain (Cassell). A pet whitefaced (*cebus*) monkey of Belt's opened the links of its chain and so escaped several times. 'It could loosen any knot in a few minutes,' whether of cord or raw-hide thong. A young female soko untied a cord that bound her, 'with fingers and thumbs in quite a systematic way,' according to Livingstone, who also describes an older male as sitting picking his *nails*. A tame capuchin monkey released

itself from the irksome bondage of straps 'by picking out the threads by which the straps were sewn to the buckles, and so rendering the fastenings useless' (Wood). Mother monkeys in Abyssinia dress the hair of their young (Mansfield Parkyns). The macaco monkey shows great dexterity in opening boxes (Buffon). The marmozet uses its fingers in turning over the pages of a book, which it pretends to read. The collared *callithrix*, disliking tobacco smoke, snatches its master's cigar from his mouth (Cassell). A female gorilla in the Dresden Zoological Gardens takes off and replaces, for the amusement of visitors, the boots of her keeper ('Nature'). A capuchin monkey took the hinges off the door of its cage in order to escape. 'No matter how firmly they were fixed, he was sure before long to extract the staples, pull out the nails, and so open the door' (Wood). The Durga monkeys of Benares occasionally 'snatch some particularly noticeable turban off the wearer's head,' among visitors to the monkey temple of that city, and now and then they 'pelt passers-by with remarkably good aim.'[1]

Mandrills that live on scorpions use their fingers and hands to lift the stones under which their prey conceal themselves (Smith).

While giving such instances of what may be called 'handiness' among the Quadrumana, it is desirable to contrast them with a parallel series of illustrations of what may equally appropriately be denominated the 'handlessness' of *man*. Inability to use his hands deftly, or otherwise than awkwardly, is not only characteristic of many individuals in the most highly civilised communities, but of whole races of man—savage or semi-savage. Thus Monteiro tells us, speaking of the negroes of western tropical Africa, that 'some of the actions of the blacks are exactly the same as those performed by monkeys. In using their hands or fingers to clean or polish a piece of brass-work, for instance, the feeble and nerveless manner of holding the bit of oiled rag, and the whole action of the hand and arm is strikingly like that of a monkey when it rubs its hands on the ground when they are sticky or dirty. Their manner of sliding their

[1] 'Graphic,' January 5, 1876, p. 123.

hands up and down on the edge of a door, or on a door-post, or along the edges of a table whilst waiting or speaking, is very monkeylike. And no black man, woman, or child ever goes along a corridor or narrow passage without rubbing both hands on the walls.'

Certain other animals use their fore *paws* or fore legs for many of the same purposes and in many of the same ways for and in which the Quadrumana and man apply their hands and arms. Thus a certain Eskimo *dog* speedily imitated civilised man's custom of shaking hands by offering its paw (McGahan); and this *shaking hands* with man by holding up its paw is one of the commonest tricks of his dog pets. 'Nature' mentions a mastiff that, as a caress or mark of affection, put his paws round a favourite companion cat, and on her death in the same way round her only surviving kitten, both cat and kitten previously sleeping habitually in his kennel, with his fore legs thus guarding them.

A large dog that had saved a small one from drowning 'cuffed it first with one paw and then with the other' (Wood). A female St. Bernard dog offered its paw to man in token of its sympathy with human distress—a sort of hand offering or shaking not at all uncommon both in cat and dog. The same affectionate St. Bernard embraced—'clasped'—a mistress in its forelegs—the equivalents in it of arms—and died with its paws resting on or in the hand of a much-loved master (Wood). Monteiro 'saw a dog eating the grains off a green Indian-corn cob, which he was holding down with his two front paws.'

The *cat* not unfrequently uses its paw to touch or tap its master's shoulder when it desires to attract his notice ('Animal World'). A pet cat sitting at a carriage window, whenever anything passing takes her fancy, 'puts her paw on my chest,' says her mistress, 'and makes a pretty little noise, as though *asking* me if I had seen it also.' Another laid her paw on the lips of a lady who had a distressing cough every time she coughed, in evidence possibly of pity, possibly in order to the physical suppression of the cough by closure of the aperture by which alone it could find vent (Wood). A third cat touched with her paw the lips of those

who whistled a tune, 'as if pleased with the sound' (Wood). Cats 'cuff' each other or their young—that is, they give blows, and so punish or administer rebuke to some unruly or troublesome kitten—with their paws. They also warm their paws before a fire, and use them for shading the face either from the fire or the sun ('Animal World'). We are told of a cat frequently patting the nose of a companion horse. It is well known that our domestic cats are in the habit of washing their faces by means of their paws, by which means also they brush and clean their foreheads and eyes. The cat uses its fore paw too in touching or testing objects—to ascertain, for instance, their hardness or other qualities ('Percy Anecdotes'), or to measure the quantity or discover the level of the fluids certain vessels may contain. Thus a cat, 'when wishing to drink water from a jug,' used its paw 'to ascertain if it was full enough' ('Animal World'). It takes milk from a narrow milk-pot by inserting its paw, curling it up for removal when saturated with milk, and then licking it (Wood). In a Birmingham burglary case, heard at the Warwick Assizes in March 1877, 'the prosecutor deposed that he was awoke by his cat patting his face, Puss having discovered the burglars rummaging his bedroom.'[1]

The *bear* uses its fore legs and paws for the purposes of embrace, either that of affection in the case of a mother and her cubs, or of mutual recognition (Buffon), or in the hug of struggle with an enemy, such as man, or some other obnoxious, and it may be inanimate, object. Gillmore mentions a North American black bear that picked up a frightened and fugitive sheep between his paws, placed it on the top of the rails of a fence, and pushed it over, so as to assist its flight—a procedure which the observer himself describes as 'almost incredible.'

Drummond mentions a lioness as giving her unruly cubs a smart blow with her paw as a quietus. Kangaroos use their fore legs and paws to hug the dog in fight (Baden Powell). The tame hare uses its fore paws in patting or clapping ('Percy Anecdotes'). And we are told of wild hares 'patting each other in the face with their paws, as

[1] 'Inverness Courier,' March 29, 1877.

though indulging in a family sparring match' (Wood). The black and brown rat and the common or domestic mouse lick their paws, and so wash their heads and faces as the cat does (Wood). The hamster and common rat wash their faces. Mice also embrace each other with their fore legs and paws (Cassell). Rats eat like squirrels, 'sitting upon their hind legs, and holding the fruit in their front paws' (Wood). The toad uses one of its fore feet to draw any extraneous matter—such as a blade of grass or a fragment of moss—out of its mouth (Jesse). The *Mellivora*, and probably other animals, use their paws to aid vision, by acting as eye-shades, just as man does (Houzeau).

The dog, cat, and other animals, moreover, use their fore legs and paws for purposes to which the Quadrumana and man do not usually at least apply their hands and arms. Thus the cat steals, by the insertion of its paw, bottled porter, milk or cream, or helps herself to water or other fluids, from vessels with long narrow mouths, inaccessible to its tongue. A certain cat, when thirsty and unable to reach the water in a jug by means of her tongue, dipped her paws in (Wood).

What may be considered in certain respects the *equivalents of fingers*, hands, and arms in man, or of paws and fore legs in other animals, subserve various useful, and some singular, purposes. Thus there is a certain land-crab of Samoa that climbs cocoa-nut trees, 'and pushes down a brown nut that is nearly ripe, and consequently easily detached from the stalk. It then descends, goes to the nut, and with its strong *claws* tears off the fibrous husk, always commencing at that end where the three eyeholes are situated, just as a native would. When this operation is completed it reascends the tree . . . . and holding the nut by a bit of the fibre, which it leaves on for the purpose, it lets it fall upon a rock or stone, and thus breaks it. When there are no other means of breaking the nut it hammers away with its heavy claws on one of the eyeholes until an opening is made, large enough to insert its narrow pincers, with which it scoops out the white food' (Boddam Whetham).

Hague speaks of certain Californian ants wringing their *pincers* in despair, as man would do his hands. Soldiers

among white ants signal to the workers by strokes of their pincers (Figuier). And ants in general use their antennæ in—

1. Examination of objects.

2. Communication of ideas, feelings, or desires (Figuier). They are instruments of language.

3. Milking Aphides, in which the deftness or adroitness of the ant, and also of the bee, has been commented on by Moggridge.

The dugong of Ceylon clasps its young to its breast with one flipper while swimming with the other (Tennent). 'I once saw a whale,' says Dr. Robert Brown, 'when the boats were approaching it, take the young under one pectoral fin and swim off by the aid of the other.'

Claws are used by some animals for certain of the purposes to which man and the Quadrumana apply their nails. In this way pea-hens are in the habit of combing out the topknots of their sons. Romanes gives a case in which a Brahma hen (foster mother) did the same to her foster son (a peacock)—'she standing on a seat or other eminence of suitable height, and he bending his head forwards with evident satisfaction.' Parrots and many other birds hold their food in their feet or claws—for instance, certain New Zealand birds mentioned by Dr. Buller. By means of their claws, too, they hold on to their perch, and scratch up earth in search of worms or otherwise. A pet bird of Bechstein's got its food by pressing a lever with its foot. The procedure was imitated by another—uneducated—bird suffering from hunger. It lifted the lid of the food box with its claws as it had seen the trained bird do. Dogs and cats use their claws to scratch up earth in making *caches* of food, to scratch at doors so as to attract man's notice, to reach or grasp coveted articles.

The *feet*—especially the hind feet—are used for many purposes, both as implements and weapons. The horse inflicts deadly injury with its hind hoofs, batters doors or fences, assaults its enemies, or protects itself from their assaults. But it also makes a more ingenious and less objectionable use of these formidable hoofs. Thus a mare

locked up in a coach-house repeatedly extricated herself by drawing up the drop-bolt with her hind hoof ('Animal World'). Sheep attacked by the breeze fly stamp by striking their feet on the ground, as an expression of their excitement (Figuier). The tumble-dung beetle of North America rolls its pellets of dung by pushing with its hind feet. A certain trap-door spider of New Zealand holds down the hinged door of its subterranean nest by means of its feet, so as to prevent its being opened by an intruder or an enemy (Gillies).

Various animals apply their *tails* to a number of useful purposes. The cat, ant-eater, squirrel, jerboa, guinea-pig, wolf, jackal, marmozet, and other animals use their tails partly as *respirators* or comforters (Lawson Tait), as retainers of heat, just as women wear boas.

The yak uses its tail as a fly-flapper, whisk, or *fan*, and the horse and many other animals in a similar way employ their tails to protect themselves to a certain extent from insect pests. Rats use their tails, as cats do their paws, in extracting or abstracting jelly, oil, or cream from preserve bottles or other vessels with necks too narrow to admit of the passage of their whole body, as has been recently proved by the experiments of Romanes, and was long ago pointed out by Jesse. An instance is given by Baird of a rat repaying the attention or affection bestowed upon it by a child companion by the useful service of whisking flies from his face by means of its tail. Miss Gordon Cumming describes an old monkey in India giving a young one a swing on its tail, just as man uses his foot with his infant. The macaco and other monkeys play with their own tails as well as with those of their fellows (Cassell), and there are probably few persons who have not seen kittens amusing themselves in a similar cheap and simple way. The marmozet (monkey) uses its own tail as a covering for its body during sleep (Cassell) in lieu of other forms of bed-clothes. The *ateles* monkey uses its tail in fishing (Houzeau), and the racoon does the same in fishing for crabs ('Percy Anecdotes'). The rat uses its tail in the guidance of the blind. Apes employ theirs in suspension and progression (Houzeau). The great ant-eater

employs its tail as an *umbrella* against rain—a circumstance taken advantage of by the Indians, who rustle the forest leaves in imitation of a shower, 'and whilst he is putting up his umbrella kill him' (Wallace).

The beaks or *bills* of birds are used in a great variety of ways. The tailor bird employs its bill as a needle, its thread being the fibre of a tree bark, by means of which needle and thread it sews a series of leaves in an intricate fashion, so as to form a waterproof cover for its nest (Baker). Hens comb out the feathers of their chickens in this way, and Romanes gives the case of a foster hen doing the same to the hair of a brood of young ferrets consigned to her care. Various birds carry their young in their beaks, as in the case of a landrail mentioned in the 'Animal World.' A common wood pigeon —a ring dove—tapped at a certain window till it was opened (Jesse), and a swan tapped at a door 'at a certain hour every afternoon' to intimate that it had come for its food supply (Carpenter). Robins and other birds frequently thus tap at windows or doors for admission, or to attract notice. The woodpecker taps the bark of trees for other purposes, as well as excavates, with its beak. The hen chases away stranger chickens by blows of her beak. The parrot, too, gives blows with its beak, and this organ is commonly used as a weapon of offence or defence in combats between various bird individuals or species. A goldfinch tied with a string a weak branch to a stronger one in her nest-building (Watson). A performing cockatoo beat time with a drumstick held in its bill (Buckland). Beaks are commonly used among birds as instruments for picking or breaking up food, fruits, and grains. Crows steal cocoa-nut oil from railway carriage boxes by prizing open the spring lid with their beaks (Wood). A raven, magpie, or jackdaw by the same means turns over and over for examination as deftly as it could with a hand any object that excites its curiosity. A raven untied knots in string and undermined the bars of its cage, while it also tested the strength or weakness of wire—all in order to escape from its cage (Wood).

Many birds feed their young or each other by passing food from beak to beak. By means of their beaks they

clean their nests of excrement, free themselves from vermin, preen their feathers, hoist themselves up wires or spars. The chick *in ovo* uses its bill to break its shell and emancipate itself.

The *wings* are used variously—as fans, as by the hive bee in ventilation of the hive, or in cooling itself (Watson); or as shade or shelter, protecting the young from danger, or from the sun in birds (White), and as weapons of offence or defence in fighting with each other. A swan in Kew Gardens knocked down a child by a blow with its wing, in order that it might rob him of some confectionery ('Chambers's Journal').

Besides being used in biting or tearing, in defence or revenge, in food capture and breaking-up, the *teeth* of various animals are sometimes employed for other purposes. Horses use them occasionally in turning water taps, working pump handles, opening gates or corn chests. Dogs pull each other's ears in play or for specific ends, as they do also woman's dress when they desire to attract her attention.

By means of its teeth the dog sometimes tears off clothes on fire from a child playfellow or a mistress, and it employs the same instrument in lifting door latches, as the horse, ass, and cat more frequently do ('Animal World'). A dog that had soiled a floor with its mud-covered feet scraped off the mud with its teeth (Houzeau). The horse uses its teeth in lifting the crawling infant from its path, for freeing itself or its fellow from vermin, or to relieve it from cutaneous irritation, however arising, to demolish its crib in the excitement of passion or disease, even for a certain kind of mutual caress. The *tusks* of the elephant are employed for uprooting trees, and with terrible effect in the destruction of the frail dwellings of the Indian peasantry.

Certain curious uses are occasionally made of the *mouth*. The monkey employs it for hiding food or stolen articles, and the dog sometimes does the same. Berkeley mentions a lame monkey using its cheek to carry nuts. The dog uses its mouth in holding and carrying as well as concealing. Thus it preserves lost coin for its master. Martin mentions a

poodle keeping a gold coin in its mouth for its master, and Tytler gives instances of a dog carrying money as well as food in its mouth when engaged in going messages for its master. It is in their mouths, too, that so many roll-purchasing dogs convey their coppers to the baker's. In one instance, related to me by Dr. John Brown, a big dog offered its open mouth as an asylum for a frightened bird, a live canary, in danger of its life from a cat or other natural enemy. In such cases the mouth and cavity of the cheeks form a natural pouch. But there are certain other *pouches* connected with cheeks, mouth, chin, throat, neck, thighs, abdomen, or other parts of the body that are used in similar ways for the storage of food or the stowage of young—such as those of the so-called 'pouch rat,' pelican, and kangaroo. And here, as in so many other cases, there is a close analogy with the habits of certain savages (Houzeau). The dog sometimes has been known to recover a boat gone adrift, towing it by a chain held or grasped in or by its mouth (Tytler).

Norwegian ponies, as I have myself observed when travelling by carriole in Norway, push open the gates that bar the roads, a procedure that saves the skydskarls—the boys who sit behind—the trouble of getting down constantly to open these gates, to do which, however, is part of the duty of the said post-boys. These ponies use their *chests* as a pushing agent, and they produce the necessary *impetus* by making a sort of leap and so dashing fearlessly against the gates.

The *head* is used sometimes as man employs it—as when the domesticated chimpanzee carries water-pitchers on its head (Houzeau). More frequently it is used for butting, though this butting is not only, always, or necessarily employed in the fight; for the elephant, for instance, butts his forehead suddenly and with great force against the trunk of the heglik tree (*Balanites Egyptiaca*), merely to cause its coveted fruit to fall (Baker).

Horns are applied to various purposes besides their frequent use as dangerous weapons in fighting—as among stags—or as means of inflicting injury on an adversary in

the case of the bull or wild boar. The domestic ox breaks fences with its horns. A bull lifted a gate off its hinges by means of its horns, employed as a hoist or lever ('Animal World'). The horns of the cow and ram are used sometimes in the extrication of lambs or ewes from positions of peril—in one case by applying them in tearing aside briars, in another by employing them as a lever (Macaulay).

The effective use of a bodily organ in many different ways as an instrument, implement, tool, or weapon is illustrated by the applications to practical purposes made by the elephant of its *proboscis* (or trunk). It can perform the most delicate operations, such as picking up a pin, and the coarsest, such as grasping and lifting a log of teak or throwing down some forest tree. By means of it the animal can gently grasp the child that strays before it on the high-road, or can seize it by the clothes and place it carefully out of danger, or it can squeeze its enemy—man—to death. It employs it in making a salaam, in presenting a gift, in clearing the way of movable obstacles, in breaking off tree branches for use as whisks, in plucking fruit, in stripping bamboos of their foliage, in ringing shop bells (Buckland), in holding and in blowing wind instruments—as I have myself seen—in playing the organ, in using planks thrown to it by man to help it to extricate itself from a quicksand (Wood), even in embracing its fellows. Of a military elephant that had been separated two years from its regiment we are told that, on the return of the regiment, 'it was quite affecting to see with what kindly recognition he embraced any of his (human) companions, placing his trunk tenderly on their neck and shoulders ('Chambers's Journal').

Very commonly animals use their natural tools or weapons *conjointly*, the one to assist the other. Thus the horse in the fight uses both its teeth and hoofs. The elephant, in destroying its cage or the peasant's hut, employs both proboscis and tusks. In killing man it may further use its ponderous feet, or bring the whole weight of its huge body to bear in crushing him to death. Claws and teeth are used conjointly by many or all of the Carnivora in destroying and devouring their prey. The black bear of North America uses both

paws and teeth in breaking nut-laden branches from trees (Houzeau).

Unaided, however, by other means many animals could not accomplish the objects they have in view—their own protection, maintenance, or comfort—did they not, in addition to the various parts or organs of their own bodies, make use of various extrinsic objects—mostly *movables*, to which they have so easy access. For various purposes they make appropriate use of—

1. Stones, pieces of rock, or other hard substances, fixed or movable—for instance, as missiles, or as anvils or wedges.

2. Pieces of stick or wood, broken from trees or found on the ground in forests, and used as clubs or cudgels, as levers, or as means of reaching objects out of range.

3. Nuts or other fruits of various kinds as missiles.

4. Leaves of different kinds, or leafy branches as whisks, flappers, fans, sunshades, punkahs, brushes or switches; or in the construction of various forms of shelter.

Stones or movable bits of rock are frequently used, in the first place, as *missiles* or projectiles, and this sometimes by most unlikely animals. Thus the Rev. Dr. van Lennep, the well-known American missionary in Palestine, tells us of a bear of the Anti-Taurus that, being attacked by shepherds and their dogs, 'retired, flinging stones at his pursuers with such an accurate aim and force that severe wounds were inflicted on them.'

The Polar bear, again, rolls down with corresponding effect huge pieces of rock from the summits of cliffs on the walrus reclining unsuspectingly at their base (Watson and Hall). Various monkeys and apes use stones as projectiles in the same way that boys employ them if they happen to be more accessible than the fruits with which from their high tree fastnesses they so frequently pelt forest travellers in tropical countries. Barbary apes pelt man or each other with fruits (Cassell). Lawson describes himself as pelted with wallah nuts and excrement by monkeys in New Guinea. Portions of the branches of trees are also frequently used by monkeys to pelt enemies or intruders. The orang when pursued throws or flings branches, sticks, and heavy fruits

from trees at its pursuers (Büchner, Pierquin), or it makes use of everything that is movable and manageable.

Just as various animals—especially the quadrumana—may be said to *arm themselves* with stones, they arm themselves even in a more human fashion with *sticks*. They not only wield them as staves, clubs, or cudgels, but first fashion them of suitable size, form, and weight by stripping their foliage or otherwise. The stick, indeed, is the *primary weapon* alike of man and the quadrumana. The gorilla uses a stick as a club both in attack and defence. By this means it gives blows to the proboscis of the elephant (Owen). The orang brandishes a stick as a weapon (Pierquin). The chimpanzee arms itself with a club (Cassell). Baboons and other apes defend themselves with sticks as cudgels (Büchner; Cassell). The sacred ape of India carries and 'stacks arms' —in the form of sticks—in a particular place (Houzeau).

Sticks, however, are used for many other purposes. The elephant in Burmah makes a bamboo rod by stripping a bamboo stem of its leaves, and wields it in its proboscis so as to knock down baskets of paddy placed by the Karens thirty feet high on trees—man's object being that these food stores should be beyond the reach or range of the animal's unaided trunk.[1] The gorilla uses a stick as a staff to support itself in walking (Owen). Certain monkeys or apes use sticks as levers (Darwin). The rat leads its blind parent or companion by means of a piece of stick held between its teeth (Watson). The chimpanzee fashions and uses its own drumsticks and drum (Houzeau).

Just as the stick is the primary weapon of savage man and the anthropoid ape, a *stone* is the first instrument of industry used by man—in the bruising or crushing of nuts or grain. For similar purposes, and in similar ways, stones are used by a variety of other animals. In some cases the stone is taken in the paw and employed to break hard nuts against some other hard substance. Thus apes take stones in their hands to break nuts against walls or nails (Darwin). The sacred monkey in this way also uses stones for pounding serpent-fangs. The howling monkey uses stones to smash

[1] 'Graphic,' August 19, 1876, p. 175.

oyster-shells (Dampier). In the commoner case of birds, shell-fish are either dropped from a height on stones or rocks or, held in their beaks or bills, they are dashed violently against stones.

Various thrushes, especially, are in the habit of smashing snail-shells on or against stones. In our own country it is a habit of the common thrush to do so by grasping the snail-shell in its bill and bringing it down with force on a stone—usually some particular or favourite stone, round which may be found a whole heap of shell *débris*—a miniature 'kitchen midden' ('Animal World'). The mavis breaks the shell of *Helix nemoralis* 'by reiterated strokes against some stone. . . . It is not uncommon to find a great quantity of fragments of shells together, as if brought to one particular stone for that purpose' (Montagu). There are, in fact, sometimes small 'shell-mounds' about these favourite 'anvils,' as Atkinson calls them. The sacred kingfisher of Australia kills small snakes by 'beating their heads against a stone or other hard substance' (Jesse). The caama (asse or swift fox) of Southern Africa is said to break the eggs of the ostrich by rolling them with its paws 'forcibly against a stone or other hard substance.' Boddam Whetham mentions a large land-crab of Samoa that, after having removed the husk of the cocoa-nut, carries the nut to the top of a tree, and lets it fall upon a rock or stone, so as to break it.

Stones are also used as *wedges* by apes (Watson). Thus they 'push stones between the open valves of the mussel-shell to prevent their closing' (Büchner). Certain birds employ stones for their *weight* as keep-fasts—for instance, in the bowers of bower birds (Nichols). And certain spiders use fragments of gravel to steady their webs.

The elephant breaks off leafy branches for the purpose of using them variously—as (1) fans or punkahs; (2) *whisks*, to brush or ward off flies or other insect plagues; (3) sun-shades (Watson).

Certain of the anthropoid apes make a kind of *tente d'abri*, a rude sort of *hut*, of the branches and leaves of trees—a dwelling quite comparable with the shelters constructed for themselves by the various primitive people who

had, or have, advanced a stage or two beyond the prehistoric troglodytes or cave-dwellers.

Many animals show their sense of the value of, or necessity for, their natural tools or weapons by keeping them in good *working order*—sharpening them in the majority of cases. The *Felinæ* generally whet or sharpen their claws; the bear sharpens both teeth and claws; the boar whets its tusks; for this purpose, probably, the cat defaces leather-bound books in libraries, and the tiger is fond of scratching the bark of trees, especially the Indian fig. Hence, too, the propensity of the stag to rub his antlers against trees in summer, to clear them of their skin and to polish them.

CHAPTER XXIV.

USE OF MAN'S INSTRUMENTS.

NOT a few animals use, and in some cases or in certain respects in the same way as man himself does, various instruments fashioned by him. Thus they know the use, and in some cases apply to their own purposes their knowledge of such use, of—

1. *Money* or coin.
2. *Doors* and gates, with their latches or handles, bolts and knockers.
3. *Boxes* and their lids.
4. *Instruments of punishment* or restraint, such as the whip or collar.
5. *Fire-arms* or other weapons.
6. *Ropes* and chains.
7. *Table utensils*, such as cutlery, crockery, and glass ware.
8. *Household furniture.*
9. Windlasses, spits, *pumps*, wheels, *bells*, turnip-slicers, forge bellows, paddles, pestles and mortars, hammers and nails.
10. Bed and body *clothes* or coverings.
11. Artificial nests or *dwellings* of all kinds.
12. *Baskets* and sacks.
13. *Musical instruments*, such as the organ, cymbal, drum.
14. *Games*, such as cricket, cards, dominoes, swings.
15. Torches or lanterns.
16. Canes, sticks, or staffs in walking.

The use of man's *coins* by the dog in the purchase of

eatables for itself or its master is a subject of the highest interest from several points of view, illustrating as it does not only—

1. The *purchase* of rolls at a baker's by tendering a copper held in the mouth, involving a knowledge of the practice, if not of the principle, of *exchange* or barter; but also—

2. The *earning* and accumulation or *saving of money*, with its storage for the future needs either of its master or itself.

3. A knowledge of *coins* and their relative *value*, including the getting of change.

4. *Bargain-making* with man.

5. Selection of a particular shop and dealer.

6. Perception and resentment of *deception* or dishonesty, or attempts thereat, real or assumed.

7. The use of *credit* and the running up of accounts.

In the town near which I reside there are at least two large dogs whose peculiarities are well known to many of the inhabitants, and especially to school children, which dogs are habitually sent by their masters—merchants in the town—to purchase bread for themselves. Each carries a penny in its mouth, and each trots off, whenever a penny is given to it, to a certain baker's shop. There they rear themselves on their hind legs, place their fore paws well on the counter, and thus firmly supporting themselves they drop their penny on the counter, receiving a roll in return. This they carry back in their mouths—in one case intact, the dog not eating its allowance till the bread being broken up and offered, it understands it to be for its own use, and devours the roll-fragments. One of these so-called 'performances' I witnessed and conducted for myself for experimental purposes. But such incidents are merely types of others of common occurrence.

Much less common, but more suggestive, incidents are the following:—A certain terrier, now dead—'Captain'—long well known in Rothesay, publicly begged money from suitable persons, showing great discrimination in the selection of the persons to whom he made his appeal. When he had an excess of funds—more than he required to buy his

modicum of bread at the baker's—he hid his money in the office of his master (who was, and is still, harbour master), or sometimes about the quay, in which latter case his hoards were frequently found and appropriated by needy and greedy quay porters or street arabs. He carried on this profitable business of begging on his own account till his teeth were quite worn down by the incessant friction of the coins he had caught up and carried ('Animal World').

A certain Newfoundland dog, when offered a coin, 'if not at the moment hungry,' would 'hide it under his mat,' thus gradually accumulating a *fund* of coppers, 'from which he abstracted a penny or halfpenny at a time, according to the state of his appetite. He knew perfectly well the difference between the coins and their relative value, and that he was entitled to receive two biscuits for the larger sum and only one for the halfpenny.' Sometimes 'he only wanted a single biscuit . . . . and wished for the *change* out of his penny. Now and then he took a fancy for a French roll by way of variety. . . . If you gave him a sixpence he would receive the change, and then allow you to take it out of his mouth, satisfied with his two biscuits' (Macaulay).

A retriever, 'in consequence of being repeatedly tricked . . . . never lets the penny out of his reach until the roll is laid down.' Another dog 'quite knew the right-sized bun, and used to keep his paw on the penny until he got it.' A third dog having once been deceived by a baker, went ever afterwards to a rival establishment on the other side of the street, always, however, calling first at the deceiver's shop to let him see the coin and custom he was losing (Wood). Instances have been given also of dogs selecting particular coins and stealing them; saving money for specific ends; buying rolls or meat on credit; running up accounts with a butcher or baker (Watson). But it is desirable that the details of some of these incidents should be re-observed, verified, and analysed.

Beggars' dogs regularly earn or *make money* for the subsistence of themselves and their masters. They sit in begging attitude; their looks are eloquently those of appeal; they receive coins in tin jugs tied round their necks; and they

take good care of the money collected. And all this they do sometimes when quite alone, without supervision or direction, while their master is helplessly bedridden in a garret lodging in some far-distant city street.

The dog does not always buy bread for itself only and carry it in its mouth. A certain Newfoundland dog acted merely as a *messenger*, carrying a basket with money, and bringing back in it a quantity of rolls, that were safely deposited in the kitchen for man's use (Macaulay).

The dog is not the only animal that buys bread; nor is bread, in some shape or other, the only article of food purchased with money by the lower animals; and *barter* among the lower animals is not confined to the exchange of coin for bread; neither are the mouth or teeth the only means used in the conveyance of coins or their *quid pro quo*. Berkeley tells us of a monkey that exchanged with a boy some nuts she had for his apples. A coaita monkey bought wine, carrying it in a pot, and refused to give up the money unless the desired article were first supplied (Cassell). Here the hands or fingers no doubt were employed, as man's are, in carrying both the money and the pot. The elephant, too, sometimes begs for money and *spends* it, buying for itself coveted articles of food, just as the dog does (Buckland). Here the proboscis is probably the organ of conveyance.

Many animals contrive to *open* man's *doors and gates*, using sometimes one organ, sometimes another—two animals, perhaps of different species, co-operating for the given end—the one lifting a latch or turning a handle, the other pushing the door or gate open.

A certain 'Peter,' a large, handsome tom *cat* belonging to a near relation of my own, was in the habit of lifting with its paws at least three different door-latches. One was the latch of a hot-plate connected with the kitchen fire, a chamber which he entered for the heat's sake, and in which he would warm himself for hours at a time. Another was that of a cellar door, in which a companion dog was sometimes confined on account of its dirty habits in the house. Whenever Peter heard the dog whine from its prison he set it free by lifting the door latch.

Door latches or handles are lifted or turned by *cats* in different ways. In some cases the paws are directly made use of to turn the handle, the two fore paws being required to do what man does with one hand. In other cases the animal makes a spring at the latch, holds on to it by means of one or both paws, and lifts it by the suspended weight of its body. In such a case it not unfrequently happens that another cat, or more probably a dog, co-operates with it by pushing open the door as soon as the latch is lifted. In other cases, again, of a rarer kind however, the cat holds on with one paw and raises the latch with the other.

A certain *cat* 'opened a kitchen door by jumping up and hanging on to the handle of the latch' (Wood). Another 'used to let herself into different rooms by jumping up and hanging on to the latch of the door' ('Animal World'). A third opens a door by springing at and hanging by one foot to the door-handle, raising the latch with the other paw. 'The latch being lifted, she descends and pushes open the door;' and this was done so frequently that the animal became most troublesome to the servants (Jesse). In a fourth case a dog rapped at a door; a cat sprang up and struck the latch so as to lift it, while the dog pushed the door open, and so gained the desired entrance (Wood).

Where it is found impossible to manipulate a latch or door-handle, both the dog and cat sometimes make use of door *knockers* and bells in order to gain admittance. Thus a certain cat 'used to knock at the door when she wanted to come in, and would endeavour to turn the handle by taking it between her paws' (Wood). The cat in such cases gets at the knocker just as she gets at the latch, but more easily, making a spring at the knocker so as to lift it suddenly and forcibly with one of her paws. The use of door knockers by the dog is mentioned by Watson. But cats and dogs are not the only animals that use door knockers, nor are paws the only organs or instruments used in lifting or striking them. Wood tells us of a horse that lifted a knocker with its nose in order to get its morning meal.

Nor are cats the only animals that can open doors or gates. Certain of the Quadrumana—for instance the

orang and chimpanzee—open doors in the same way that man does, even using a *key*, as in the case of a certain chimpanzee (Houzeau). One orang-utan opened a padlock, using a stick as a key, or more properly a lever (Houzeau), and others open other kinds of locks, including those of doors (Pierquin). A certain retriever had a knack of forcing shutters and opening doors, so as to effect his escape when imprisoned. A horse was troublesome from its ability to open its stable door. A cow 'was in the habit of lifting the latch with her horn, and then pushing the gate open;' while other cows opened a byre door by 'inserting the tip of a horn into the finger hole, lifting the latch, and then drawing the door towards them;' so that we have, even in the same species, sometimes pulling, sometimes pushing, as circumstances require. Even an ass was sagacious enough to open every gate about a house (Wood). In some cases the 'trap-doors' of spiders' nests in the South of Europe 'have a handle or flap attached . . . . for more convenient use of the spider' (Moggridge), probably in holding them down against entrants; for beetles lift up or open such hinged doors, and so gain access to the nests of a New Zealand species (Gillies).

While, however, it is far from uncommon for cats, dogs, horses, ponies, donkeys, or cows to open the doors of houses, rooms, stables, or byres, or the gates of gardens, paddocks, or poultry yards, it is not at all common for them to *shut* them. But this is sometimes done when the animal has a sufficient *motive*. Usually its object is simply to gain access or egress. But occasionally an astute animal thinks it desirable or necessary to barricade out of a tempting paddock a hated rival, or to conceal the evidences of its transgression of its master's rules; or it may be that it shuts it because it knows the door or gate is usually, and should be, shut when not in use. Thus a gentleman, who has been a great traveller and a keen observer of the habits of wild and domestic animals, and is now a proprietor-farmer in one of the western islands of Scotland, told me of a pony of his own that both opens and shuts field-gates by means of its teeth or otherwise, the shutting or closing being a com-

paratively rare, while the opening of them is a common, occurrence. It shuts gates, for instance, against other animals that are not its favourites, and especially against a particular horse which it dislikes and kicks, as well as barricades out of good pastures. It closes them also after itself, to prevent the discovery of its delinquency in going from a permitted pasture into a forbidden one.

Monkeys, too, in theft, shut as well as open locks and doors. They turn the key in a door, so as to make it fast, when they wish to prevent intrusion upon, or interference with, their depredations. Shutting of doors is mentioned also as occurring in the dog (Watson).

Many of the Quadrumana that have been tamed or domesticated by man—that have become his household pets, and even members of his household—use, and in the same way that their masters do—

1. *Table utensils*—including plates, cups, and saucers; knives, forks, and spoons; glasses and tumblers, decanters and jugs; toothpicks and serviettes.

2. *Household furniture*—such as chairs and tables, beds and bedsteads.

3. *Man's clothing*, both body and bed, including finery or ornament in dress, and uniform.

Various of the anthropoid and other apes *sit at table* with man and partake of his meals, behaving frequently with admirable propriety, the result partly of imitation of man's habits, partly of man's tuition. They eat and drink in the same way that man does, employing their fingers and hands in holding glasses or cups, forks or knives, in the same way, and using, moreover, the same articles of food, and the same beverages.

The orang-utan wipes its lips or mouth after eating, using a serviette; it employs a toothpick as it sees its master do; it makes appropriate use of a teapot, cups, saucers, and plates, knives, forks, and spoons; among other table civilities or courtesies it touches glasses with its neighbour; it draws corks, pours out wine or other fluids from bottles, and drinks from glasses. Moreover, it makes a bed and arranges bedding; it employs a chair not only for sitting

on at table, but as a mount to get at anything out of its ordinary reach (Houzeau, Pierquin, Cassell). An orang-utan that used glass vessels for drinking from never broke them, but 'put them carefully aside after using' (Büchner).

The chimpanzee behaves in a similar way when a member of man's household, using chairs, serviettes, glasses, cups and saucers, spoons and forks, making beds, sweeping the house, and assisting the cook in carrying water (Houzeau).

Not a few animals have a knowledge of the use or effect of various of *man's weapons*, and this knowledge inspires them with a salutary dread that in its turn leads them to keep *beyond their range*. Thus a dread of the gun is characteristic of the crow, rook, and raven in our own country, where sad experience has taught them too many practical lessons of its dangerous power (Watson). To such an extent is this fear carried, acting on their imagination, that the very sight of a gun—which may be empty—or of anything resembling a gun or a man with a gun, keeps these wary birds at least out of rifle-range of man.

But certain animals can, and do, turn man's weapons, and successfully sometimes, against himself. Thus Drummond describes a baboon that was wounded by a Kaffir's spear as snatching the weapon from its own body and trying to stab him with it, as well as plucking one that had missed its mark and stuck in a tree and throwing it back at him, 'though it came crossways, and not point first, as a spear ought to.' Schweinfurth, too, tells us that chimpanzees in Central Africa, when driven to bay by the Niam-niam hunters, armed with spears, wrest these spears from their human pursuers, against whom they 'make good use of them.' The orang has been taught even to use man's fire-arms (Watson).

The horse, ass, pig, and perhaps some other animals, help themselves to water occasionally by working *pumps* or pump-handles. A pony has been known to turn on and shut off a water tap with its teeth, letting on and stopping the flow of water, satiating its thirst, and then preventing waste ('Animal World'). This shutting the tap is, like shutting gates or doors, the result of unusual care or

thoughtfulness, the commoner procedure in all cases being to leave them—whether taps, gates, or doors—open. Wood tells us of a horse that was in the habit of working a pump for his own behoof. He 'took the handle in his teeth, worked it up and down, and when the water was in full flow placed his mouth under the spout to drink.' An old pig did something of the same kind in order to get at a supply of whey, taking hold of the pump-handle by its mouth ('Animal World').

Other animals work other instruments in a similar way. Thus a cow was in the habit of 'turning the handle of a turnip-slicer when the hopper had any turnips in it,' and then fed on the slices that dropped out (Jesse). Certain performing elephants 'play the organ' simply by regularly turning its handle. Certain dogs were once used to turn spits in kitchens, and were known, from the nature of their special training or breeding, as 'turnspits.' A hair-dresser's dog turned a wheel that moved a revolving hair-brush—the dog and its wheel being stationed in a room above the perfumer's operating chamber, the animal acting at the sound of a bell rung by its master ('Animal World'). A tame chimpanzee on shipboard took its place among the sailors in working the capstan (Houzeau). The titi monkey can use man's paddles in rowing canoes, keeping time or 'stroke' (Cassell). The dog and other animals have been taught to blow the forge bellows, or otherwise to assist the blacksmith.

Certain of the Quadrumana—various dogs and cats and other animals—use *ropes* or their equivalents in a considerable variety of ways. Perhaps the commonest illustration of their use is *bell*-pulling, while the most important is the conveyance of ropes ashore or on shipboard during shipwreck. Bell pulling or ringing is a common trick or feat of the dog or cat—one that it teaches itself, or acquires for itself, for its own ends. These ends include not only the common one of gaining admission to this or that house or room, but also the commendable one of keeping servants on the alert (Watson), or of communicating information to them, as well as the nefarious one of deceiving servants in

order to plunder them—distracting their attention, and meanwhile, for example, stealing from the dinner trays they may have set down, or the dinner tables they may have left unguarded, in their haste and unsuspiciousness. A lodge-keeper has trained his poodle to ring a given bell by pulling a rope whenever a carriage comes in sight, whereby its master is warned in due time to have the gate opened ('Animal World').

Moreover, the cat and the dog in various ways *answer* or attend to man's bells or bell-ringing: they know what they signal, and act accordingly—the dinner signal or bell being naturally that which meets with promptest attention and excites liveliest interest. But not second to it in many cases is the door bell and the ring that announces, or is supposed to announce, the home-coming from business or a journey, from church or shopping, of some much-loved master or mistress.

A dog, swimming to a ship, had a rope with a noosed end thrown to it by friendly sailors. The sagacious animal first got its fore paws, then its head and chest, and lastly its body, fairly into the noose, and was thus hoisted safely on board. But in carrying ropes to or from vessels at sea, in cases of shipwreck or otherwise, the dog usually tows the rope by means of its mouth—holding it firmly between its teeth. On board ship the tame chimpanzee can handle ropes like a sailor (Houzeau).

Berkeley gives an amusing instance of the use of hammer and nails by a monkey. In the absence of its master it got access to his amateur workshop, and used a hammer and nails, on which it laid hold, in the way it had seen its master use them. 'He (the monkey) nailed everything on the long table and about the room together, without reference to colour, sort, or size, and grinned his satisfaction when he saw his kind master taken by surprise.'

Certain generalisations in connection with the use by the lower animals of tools or weapons are here desirable.

In the first place, these animals are given to *select* that instrument which is at once most accessible, nearest at hand, and most suitable for their purpose. Of other animals

it may quite as truly be said as of man, '*Necessitate quodlibet telum utile est*' (In necessity whatever avails is a useful weapon).

If, therefore, instruments fashioned by man present themselves, and are quite as serviceable as, or more suitable than, the natural implements they would otherwise employ, they *substitute* the artificial for the natural. Thus thrushes, that usually break snail-shells against pet stones selected by themselves, sometimes employ the ironwork of garden seats ('Science Gossip').

In this case, as in many others, we have also the *conjoint use of the natural and artificial* instrument; for the thrush uses its beak to hold the shell which it dashes against the hard iron. The dog seizes the trailing bridle of the runaway horse or pony in or by its teeth, and so stops its flight. Dogs or other animals that are taught to blow bellows must use both their own mouths, teeth, paws, or hands, and man's instrument.

Whether, moreover, their instruments are natural or artificial, or partly the one, partly the other, man's implements being worked by means of animal hands, paws, teeth, mouths, or other natural organs, other animals, like man, may be said to make the most of such instruments, to employ them to the *best effect*.

CHAPTER XXV.

USE OF CLOTHING AND SHELTER.

ONE of the mistakes committed by those who are perpetually endeavouring to differentiate man from other animals is to assert that man is the only animal that *wears clothing* or dress; the fact being, as is, or ought to be, well known, that many savage races live habitually in a state of absolute nudity, whereas—and this circumstance is less likely to be familiar—certain of the lower animals either construct rude clothing for themselves or make use of that provided by man. No clothing is worn by the Andaman Islanders (Owen). I have myself seen large bodies of Egyptian fellahs in a state of absolute nudity labouring on public works along the line of the Alexandria and Cairo Railway. Nakedness, the non-use of clothes, also characterises the wolf children of India, as well as other forms of brute, beast or wild children. Of an Indian wolf-child Gerhardt tells us, 'He never kept on any clothing;' and of another, 'Clothes he would never wear, but tore them up into fine shreds.' And, lastly, even in civilised life *nudity* is a common propensity in the human idiot and lunatic, as well as in various other conditions of disease, such as fevers.

On the other hand, 'A friend of mine,' says a correspondent of 'Nature,' 'had a tame baboon which . . . . wrapped itself in a sheepskin like a Kaffir.' Another baboon used leaves or mats as a covering for its head and body (Nichols). Monkeys exposed to cold use wraps besides 'cuddling' each other for mutual warmth (Cassell). The young soko 'covers herself with a mat to sleep,' according to Livingstone. Others of the anthropoid apes wear *man's*

clothes, in the same way that man does; and not only so, but they frequently show a pride or vanity in their clothes, dress, or finery, as savages so often do. Thus a female orang at the Jardin des Plantes, Paris, wears a surtout, and 'prudishly draws it down over her feet on the approach of strangers.' She 'sleeps in a *bed*, with sheets and blankets, putting her hands under the covering or up the sleeves of her night dress to keep them from the cold.'[1]

Dr. Yvan, who was attached to the French expedition to China in the year 1843, tells us that 'a certain Borneo orang clothed himself as soon as ever he could lay hold of any piece of stuff for the purpose.' Lady Verney mentions an orang on shipboard that put on a flannel shawl every morning as it became cold, crossing it tidily over its chest, in imitation of an Indian Governor-General's wife who was on board. Another orang made her own bed, using blankets and pillows (Cassell). And fondness for dress or toilette, even for perfumery, the result, no doubt, here again, of *imitation*, has been noticed in the same animal by other authors (Pierquin). The chimpanzee, when tame, also sometimes wears clothes, dresses himself in part at least, and exhibits the same kind of pride in his dress that many savages do. Many domestic or tame monkeys or apes also dress, or allow themselves to be dressed, in man's habiliments, as must be familiar to all who have seen the monkey pets or assistants of organ grinders in London and other large cities. Réaumur describes the larva of a fly as dressing itself with the skins of Aphides, or in place thereof with silk or paper. Kirby and Spence describe certain bees as clothiers.

Many animals prepare their own natural *beds*, and some use natural *bed-clothes* or wraps, while others avail themselves of the beds and bedding provided by man. Orangs prepare beds of boughs and leaves between or under trees. They generally lie on their back or side, resting the head on their hands. In cold, windy, and rainy nights they cover themselves with branches or leaves, and hide themselves under them (Büchner and Nichols). Wallace refers to the orang preparing itself a sleeping-place for the night. Dr. Abel

[1] 'Graphic,' March 6, 1875.

in Java, had a young one 'that used to prepare himself a proper bed every evening with boughs and leaves . . . . Afterwards, on the voyage home, . . . he used to make himself a bed with sail-cloths, and rolled himself up therein . . . . If canvas was not to be had he would take the sailors' shirts and clothes which were hung up to dry. Vosmaër had an orang that exhibited the same cleverness in arranging his bed.' Of another on board ship it is recorded, 'He never came on deck without bringing his woollen *blanket* and wrapping himself in it. His bed he accepted gladly, although he had never known such a thing previously,' and before sleeping in it he himself made it up properly (Büchner). A writer in the 'Fancier's Gazette' describes his dog, after fighting a match, going home and betaking himself forthwith to his *master's bed*, in which he was found between the sheets, with his head on the pillow. 'He had made down the bed for himself and turned in, and the black mud and blood from his coat had soaked through both sheets and feathers.'

What has been called the *clothing instinct*, then, cannot be said to be confined to man; for not only is it frequently absent in him, but it is occasionally present in some other animals that use dress or clothing, shelter or protection for the body by day and night, either of a natural or artificial kind, including ornament or finery, the decoration of the person (Houzeau). In their trappings and insignia of rank, or of the rank of their riders, such animals as the horse and elephant even show a *love of finery* or dress, and it cannot be said that either the love or the use of dress arises in all cases from imitation of man and his customs or costumes.

Another error of those who contend for man's supremacy over all other animals is to describe him as the only animal that constructs for himself, in the form of dwellings of some kind, a permanent and proper *shelter* from the vicissitudes of the weather; for, in the first place, there are, or have been, many savage races who either constructed or construct no dwellings of any kind, or whose huts or hovels cannot compare architecturally with the nests or other habitations of many of the lower animals. Certain pre-

historic peoples, some ancient savage races, such as the Caribs, and also some existing savages, made or make use of the natural shelter afforded by rocks, caves, forests, or trees. The Australian aborigines and other races, semi-civilised as well as primitive, have no fixed dwelling-place, are true nomads; and their tents or huts, when they have any, are of a temporary and trivial character.

The South African Bushmen live 'in holes in the earth, dug out with their hands' (Büchner). According to the missionary Sicherer they 'live in holes dug in the earth . . . . thatched with reeds so badly put together that the rain pours through. Here they lie close, like pigs in a stye. They have neither huts nor sheds.' Their houses, according to the Rev. Dr. Moffatt, are mere holes in the earth, lined with grass, covered with tree branches. The huts of many Central African savages resemble externally the ant-hills of Termites (Adanson). There are no dwellings, or no fixed ones, among the Dokos. The natives of the Philippine Islands and Borneo sleep under trees, or on trees, or in caves. The ape men of India also live in trees. The Apache Indians sleep in hollows of the ground (Büchner). Where constructed abodes occur in primitive or savage man they resemble those of many animals in the equal absence in their construction of calculation, science, and art (Houzeau). The Veddas of Ceylon, according to Hartshorne, live in forests without dwellings, or they shelter themselves in caves or hollow tree-trunks, or roost on trees. Dwellings are most primitive in the Andaman Islands (Owen). The Bukones 'roost' in trees on a platform of sticks, as do also certain of the anthropoid apes. These human dwellings are nests rather than huts, though covered with a cone-shaped roof, also of sticks, thatched with grass (Lady Verney).

The wild people—the jungle dwarfs—of the Western Ghâts in the Tinnivelly district of India have no fixed dwellings or dwelling-places. They 'sleep in any convenient spot, generally between two rocks, or in caves near which they happen to be benighted' (Bond). These wild folk of the hill jungles of the Madras Presidency are in reality modern troglodytes or cave-dwellers, the representatives of those

prehistoric men whose remains possess so much interest for anthropologists. The beast men and wolf children of India and Europe resemble savage races on the one hand, and many wild animals on the other, in their non-possession of other shelter than that which is afforded by caves and forests. Not only have they no proper dwelling, but there is incapacity for constructing artificial shelter. The wolf children of India inhabit caves and forests, just as do the wolves with whom they associate and by whom it is currently believed they are, in some instances at least, brought up. 'At the Lucknow madhouse,' says Gerhardt, 'there was an elderly fellow . . . . who had been dug out of a wolves' den by an European doctor.'

Even in civilised Scotland of the present day we have a race of cave-dwellers in Caithness-shire, whose mental characteristics have been described by Dr. Arthur Mitchell. And in the large cities of England there are hosts of waifs and strays of society—of gutter men and children—of tramps of all kinds, who sleep under railway arches or in other equivalents of *caves*. In Scripture times, too, man dwelt frequently under trees, stones, or rocks, or in caves.

If the nature of man's dwelling is to be regarded as any reflex of his degree of mental development, much cannot be said for the present mental status, the constructive skill, of the hut builders and dwellers of our own Scottish and Irish highlands and islands. The hovels of the Hebridean Islanders, for instance, are no advance on those of many savages, and are not equal, *mutatis mutandis*, to the nests of many birds. Thus, when compared with them, the bowers of the bower bird appear at a decided advantage (Nichols).

On the other hand, the chimpanzee constructs a dwelling or *hut*—albeit there are certain defects of construction in the roof (Du Chaillu). The gorilla also build huts—*tentes à l'abri* (Cassell). Wallace mentions the orang as making in trees, with boughs, what he calls 'a leafy hut, that quite concealed him from our view.' Cameron is said to have seen, on the shores of Lake Tanganyika, monkeys that 'build a new house every day.'

Again, the beaver weaves a protection against cold in

the form of a round or dome-shaped, conjoint or compound, dwelling, resembling in its structure the basket-making of man, and the wattle huts of savages or settlers. The round form of the beaver's hut appears to be a natural or primitive shape of the dwelling both in man and other animals. It is illustrated alike in the hut of the savage, the nest of the bird, and the cell of the bee (Houzeau).

Moreover, various animals show their appreciation of *shelter* from wind and rain, from shower or sunshine, by availing themselves of the protection of man's houses, sheds, walls, hedges, or fences, as well as of the natural cover of forests or trees, rocks or stones, hill-sides or stream-banks.

And, lastly, they recognise the necessity for shelter in the case of man; and here their generosity, unselfishness, disinterestedness, or self-sacrifice becomes manifested, as it is in so many other circumstances. The elephant, horse, and other large animals either offer the shelter afforded by their own bodies to their masters—shelter not merely against excessive heat or cold, but not unfrequently against the cruelty of fellow-man—or they afford it, whether or not man seeks it, if they see its desirability on his behalf. The Arab horse, for instance, in the sun-scorched plains of the East, offers the shelter of its body against the powerful sun-rays, while runaway or drunken sepoys have found an asylum under the bellies of friendly elephants.

CHAPTER XXVI.

PREPARATION OF FOOD.

Among the many epithets that have been bestowed on man to distinguish him from all other animals, he has been described as pre-eminently a *cooking* animal—the only animal who cooks or prepares his food prior to using it. The futility or fallacy of such a distinction, however, is proved by the fact that, on the one hand, there are whole races of man that, ignorant of the production of *fire*, have and take no means of preparing their food; while, on the other, there are certain animals, equally unable themselves to produce fire, that yet use various means of *preparing food*, or have the sense to adopt the results of *man's cookery*.

In the first place, then, there are many savage races of man who use flesh and fruits in their *raw* state, sometimes even in a condition of disgusting putridity. Not only so, but they devour *living* animals, or flesh cut from living animals. Moreover, they tear flesh food with their teeth, after the manner of the Carnivora.

The *animal* food on which such savages subsist includes—

1. Wild animals, both of the larger and smaller sort, including serpents and lizards, mice and other 'vermin.'

2. Fish.

3. Molluscs, such as snails, and various marine shell-fish, such as cockles, oysters, and mussels.

4. Various worms and insects or their grubs, including ants and lice.

5. Various animal products—such as wild honey, milk, marrow, fat, or oil.

The *vegetable* food which affords a means of subsistence,

with or without animal food, includes wild plants, roots, fruits, and berries.

But the appetite of savage man is not confined to animal or vegetable food, nor to both in various combinations. He also eats dirt, *clay* or mud, as well as matters infinitely more offensive. He may be said, indeed, to eat anything, to be omnivorous (Houzeau). The subject, however, of *morbid appetite* in him, as in other animals, is so extensive as to require separate treatment.

Many human *savage* races live, as other animals do, by hunting and fishing, by grubbing up roots, or gathering fruits. Some of them eat lice, as monkeys do (Houzeau). 'Until the arrival of Europeans the Australians knew nothing about cooking or boiling food' (Büchner). Carrion-eating is common among the Zulus (Colenso). The Bushmen of Southern Africa live partly upon 'small birds, which they swallow unplucked.' Lizards are eaten raw by the Digger Indians, 'with no other preparation than pulling out the tails;' and they also eat 'dead horses, till nothing is left but the bones,' as well as other forms of putrid or mouldy meat. Part of the food of the Apache Indians consists of stolen horses and asses. 'The beasts are not slaughtered, but torn asunder.' There is no cooking of any kind among the Dokos and Mincopies, the food being eaten raw (Büchner).

The Hamram Arab in Abyssinia, as was long since pointed out by Bruce, and as has recently been confirmed by Baker, cuts and eats steaks from live oxen. The Veddas of Ceylon, according to Hartshorne, live on wild honey, lizards, and the flesh of monkeys, deer, and boars. The wild men of the Tinnivelly ghâts, too, 'feed chiefly upon roots and honey.'[1]

Wild men and *beast children*—including, for instance, the *wolf children* of India—usually show these theroid propensities in regard to food-capture and use even in a more marked degree or form. They tear and eat raw flesh, gather and gnaw bones like dogs, catch and swallow flies, bite the heads off live fowls, lap water with their tongues. Of one of them Gerhardt says, 'He drank like a dog, and liked a bone and

[1] 'Academy, May 1875.

raw meat better than anything else. . . . His civilisation has progressed so far that he likes raw meat less, though he will still pick up bones and sharpen his teeth on them.' Of others he remarks, 'Before they eat or taste food they smell it, and when they don't like the smell they throw it away.' A boy found in company with a female wolf and her cubs 'rejected cooked meat with disgust, but delighted in raw flesh and bones, putting them out on the ground under his paws like a dog,' according to Colonel Sleeman. Of the same boy Professor Max Müller says, somewhat contradictorily of the above assertion as to cooked meat, 'The wolf child could devour anything, but preferred raw meat. He even ate half a lamb without any effort.' Even 'a quilt stuffed with cotton, given to him in cold weather, was torn by him and partly swallowed'—a kind of indiscriminate appetite and depraved taste that is frequently paralleled among the human insane in British and other lunatic asylums. Another wolf child 'would eat nothing but raw flesh.'

Similar bestial, feral, or animal appetites are likewise to be met with in the human *idiot* and *lunatic*, as well as in criminals, and in others of the degraded classes of civilised human society. An idiot described by Professor Cesare Lombroso 'smells food before eating,' as a dog would. I have myself had not a few patients who lived in great measure on grass, or the leaves of various trees or shrubs, or who would eat all manner of garbage or any kind of indigestible metallic substance. Dr. Browne, too, gives many instances of the use by the insane of *raw* flesh, of half-dead leeches, and of *living* kittens, rats, mice, frogs, beetles, worms, spiders, and caterpillars. But all such cases belong to the important category of *morbid appetite* in man, and cannot be discussed or described here.

Even among men who are neither idiotic, insane, criminal, nor illiterate, who represent, on the other hand, the highest intelligence and refinement of the age—in the armies of the foremost nations of the world—the carnivorous thirst for blood during war or battle, may be regarded as an illustration of the difficulty of concealing or overcoming man's natural bestial appetites. But we need not go far afield,

nor to the exceptional conditions of war, for instances of the same thing. The nose-biting of the Hanley dog-fighters of Staffordshire, and of their representatives in other English counties or cities, shows how little civilisation has yet done to humanise certain beast or brute men in our very midst.

On the other hand, there are certain animals that, though they do not cook food—that is, prepare it directly or indirectly by means of fire—nevertheless subject it to some rough sort of *preparation* prior to using it. Thus the American *procyon* washes its food; the elephant frees from insects and dust the branches it purposes to eat; the sacred monkeys of India destroy the fangs of venomous snakes before eating them (Houzeau); the common seal holds its food (e.g. a ballan wrasse—a fish) in its fore paws, carefully denuding it of its skin before devouring it (McIntosh).

Again, there are many animals that make free use of *foods cooked by man*, while a few assist him in the art of cooking, including the tendance of ovens, the turning of spits, and the regulation of *fires*. Thus a Borneo orang, according to Buffon, ate meat and fish, boiled and roasted.

Among the animals that imitate man in the use of boiled, broiled, baked, or roasted meats or other foods, and of hot drinks, are the dog, lori, chimpanzee, and bear. Sometimes they acquire a partiality or preference for cooked foods, and they use them even when hot from the oven or fire, or while in the oven, on the fire, or 'on the boil.'

Thus the bear has been known to snatch and eat directly from a fire meat that was, or was being, cooked, distributing portions to her cubs (Houzeau). Some of the anthropoid apes, moreover, use the same prepared food or drink in the same way as man. Thus the siamang waits for the cooling of his tea or coffee—more probably a lesson taught by experience than the simple result of imitation. The orang also uses tea, sugar, and milk in proper proportions, adds the milk and sugar herself, and drinks the tea as her master does, allowing it to cool sufficiently (Cassell).

Young salmon are systematically fed on fried liver or steak, powdered, at the Stormontfield breeding ponds, on

the Tay, near Perth, as they were also in the New Zealand acclimatisation experiments between 1867 and 1872.

The anthropoid apes both light or make up and tend *fires*, and they *cook* food thereon or thereby just as man does—in short, exactly imitating all his operations. Thus on shipboard they 'light a fire and cook food thereon. . . . De Grandpré tells us of a chimpanzee that heated the oven, let no coals fall, and summoned the baker when the oven was heated' (Büchner).

CHAPTER XXVII.

FACULTY OF NUMERATION.

Among the many marks of low intelligence, or of stupidity, in savage man that have struck travellers, has been their defective knowledge of number, their want of arithmetical power (Wallace). Indeed, in a sense it may be said that certain savages have no proper arithmetical knowledge, power of mental arithmetic or of arithmetical calculation—of any kind. They can scarcely be said to possess either the 'science of numbers' or the 'art of reckoning by numbers,' unless in a very limited sense and in a very rudimentary degree. Thus the Veddas of Ceylon are described by Hartshorne as 'quite unable to count. . . . . They cannot count even by the aid of their fingers, having no conception of number.'[1]

Among the Amazon Indians there are no words for numbers, and there is a similar want of arithmetical power—ignorance of arithmetic, the most limited ideas of numbers—among the Eskimo and the Australian blacks (Houzeau). Even at the present day many savage tribes of Brazil and Australia cannot count beyond two or four. 'They have not carried their numerals beyond three or four, and can only indicate higher numbers by gestures. Oldfield even describes a tribe who count no further than the number two, and designate all beyond by a word signifying "many."' A member of this tribe, after several vain attempts—by enumerating the names of the individuals—to give an idea of the number of men killed in a certain native battle, 'ended by raising one hand three times in succession, by which he wished it to be understood that the number amounted to fifteen.' The

[1] 'Scotsman' and 'Daily Telegraph,' August 30, 1875.

aborigines of New Caledonia 'can with difficulty count the lowest numbers.' So that counting, arithmetic, or an arithmetical sense—ideas or notions of number—are certainly not innate in man (Büchner). The faculty of calculating numbers is gradually developed in him, like so many other of his acquirements, by education or cultivation.

Certain of the lower animals possess a power of counting or calculating numbers comparable, at least, with that which characterises the savage races of men above specified. Thus, in Scotland, the shepherd's dog must estimate exactly the number of sheep under his charge. One is mentioned, for instance, that, during the process of sheep-washing, brought to the washing troughs, and without instruction, a series of detachments of ten sheep at a time, running off for a fresh detachment whenever he saw three only left in the pen ('Land and Water').

In North Wales 'a shepherd will order one of his dogs to fetch three sheep out of a flock on a hill some distance away, and the dog will faithfully drive the required number' to its master—a circumstance, it is added, 'commonplace enough to sheep-breeders.'[1] The collie, sent to collect a flock or flocks from many square miles of hill pasture, must know their number when he brings all together without a single omission; and a knowledge of the number of sheep in a flock must have been possessed also by certain sheep-stealing dogs ('Percy Anecdotes'). Again, the sporting dog notices correctly the number of birds that drop to the rifle of its master (Nichols). Thus Mr. Berkeley's 'Wolf' went back, unbidden, at the end of a day's sport for a wounded pheasant shot in an early part of the day. Dogs also count correctly the number of railway stations that have been passed, or of the stoppages that have been made, in a given journey (Nichols). The performing dog Minos, that was exhibited in London in 1875, was said to display 'thorough efficiency in the first four *rules of arithmetic*—addition, subtraction, multiplication, and division.'

'A mouse from whom nine young ones had been taken came nine times to fetch them back one by one, and then no more, although she had not been able to look into the cap in

[1] 'Graphic,' December 5, 1874, p. 538.

which they were imprisoned. The magpie can count to four, but no further. If four hunters hide themselves before her eyes, and three of them go away, she knows that one is still there, and is on her guard. But if . . . . there are five . . . . and four go away, she thinks that all are gone, and becomes careless' (Büchner). Such assertions, however, require confirmation. Meanwhile they furnish useful hints for man's experiments. Bees destroy excess of eggs laid by the queen (Figuier). Apes attack a solitary man, or one or two men together, but do not venture to approach a large party (Munzinger); and there are probably many other animals that, in war or otherwise, correctly estimate the numerical force or strength of the adversary, and act accordingly.

Instances of *calculation* of numbers have been given in the carrion crow or other crows ('Percy Anecdotes'). Houzeau, Leroy, Combe, Vimont, and other authors think it indubitable that the horse and mule, as well as the dog, crow, and magpie, or other animals, possess notions or appreciation of number up to a certain point—limited, but still decided. Watson speaks—and I doubt not correctly—of the dog and other animals being puzzled, or having puzzles, in their mental arithmetic.

Wallace comments on the difficulty of proof in the various experiments that have been made to determine the point whether animals can estimate numbers. There can be no doubt that further *experiment* is desirable, in so far as it cannot be said that the nature and extent of the knowledge of numbers possessed by various animals are yet thoroughly understood, or have been satisfactorily demonstrated. There may be a perception of number in the case of dogs that can distinguish playing cards (Low). The proper management of sheep by the collie apparently implies a knowledge of numbers (Watson). There is probably some estimate of numbers, and of their united power, in the deer at bay in presence of a pack of hounds (Low). Dogs that travel by railway, and get out at the proper stations, probably count the number of previous stoppages, though no doubt they may also, or rather, have been guided by their observation of the persons or things to be met with at a particular station, and not at certain others.

CHAPTER XXVIII.

POWER OF CALCULATION.

THAT many animals possess a wonderfully correct knowledge of *time* and its flight, and that they act appropriately upon that knowledge, cannot be doubted. What is the nature of their knowledge, or how acquired, is not so apparent. Some authors speak of their ability to count, reckon, measure, or *calculate* time, or its intervals or lapse (Watson, Broderip, Jesse, Low, Combe). Dr. Carpenter, for instance, speaks of 'that remarkable power of *measuring time* which many animals certainly possess;' but whether they really do so cannot, perhaps, at present be determined. Many animals, however, have—

1. Stated or fixed times for work, play, or meals (White).

2. Our domestic animals have regular hours for going to bed, getting up, or going for water (Houzeau).

3. Milch cows have their fixed hours for their midday milking and their evening rest, and they know when they may expect escape from their byres in the morning.

4. Many birds, dogs, cats, and other animals know—to a minute almost—man's meal hours.

5. Many dogs distinguish Sunday from all other days in the week, as well as holidays, market days, fair days, from the other days of a month or season.

The knowledge of *time* manifested in these different cases, and by a great variety of animals, obviously differs much in its character. Authors have variously and vaguely spoken, for instance, of animals possessing—

1. A knowledge or recognition of the progress or passage of time, a consciousness of its lapse.

2. A power of measurement of intervals—of minutes, hours, days, or weeks.

3. A keen observation of hours, days, and seasons; of the progress of the sun, of the sequence of light and darkness.

4. Notions or ideas of time or duration.

5. Precision in marking time.

6. Distinction of time by observation and inference (Watson).

7. Appreciation of such natural phenomena as dawn, noon, and sunset.

8. Observation of man's movements and of the circumstances or things that mark certain hours of the day and days of the week—in short, of concomitant phenomena.

9. A sense of periodicity, which gives rise to punctuality or regularity.

10. Knowledge of the succession of events, the possession of what phrenologists call the faculty of eventuality.

Some of these explanations or suggestions are satisfactory in certain cases, others are plausible, while others again are problematical and destitute of any sort of proper proof. On the whole, it must be confessed that our knowledge of the various modes by which animals acquaint themselves with hours and days is far from being complete or satisfactory. Hence it offers an excellent and interesting field for *experimental enquiry*.

We are, however, in possession of a large body of facts showing that animals have a certain knowledge of time, and it is desirable that illustrations should be given of the various kinds of their time-knowledge—with the modes in which they display it. Nor is it irrelevant, in the present state of our information on the subject, to consider some of the suggested explanations that offer themselves, or that have been offered.

One of the commonest kinds of time-knowledge exhibited by the lower animals—the kind which most strikes man—is that which relates to the *hours* of the day, especially to man's meal hours. Various tame, or even sometimes wild, animals come to be fed at the meal hours of a family, and they make no mistake as to these hours. I have several times noticed this myself in the case, for instance, of the common sparrow,

blackbirds, and starlings, the pensioners of a certain Lady Bountiful in one of the western suburbs of Edinburgh.

These birds came for years, and still come, all the year round, to be fed at a certain time—eight o'clock in the morning—their meal consisting of bread-crumbs from the breakfast table. They hover on neighbouring trees and bushes, in the garden of the house, about the proper hour, and wait patiently till they see or hear a certain window opened and their bountiful provider appears with a plateful of bread-crumbs prepared for being thrown out. Then they alight on the grass, and are as ready for their work as a crowd of city boys would be to scramble for a handful of coppers cast among them. After picking up the fragments the birds disperse, not to reappear, at least in a body, till next morning. How or why they come to congregate in the proper place at the proper time I am not prepared to explain. They may be guided simply by observation of the signs that indicate the approach of breakfast—the opening of shutters, the movement of servants, the sounds of breakfast trays and crockery, and the law of association of ideas, which is as operative in them as in man, probably connects these phenomena of morning life in the household with that which invariably forms a part of the phenomena—though a subsequent part—their own breakfast. There is unquestionably both observation and inference in their action when a certain window is opened and a certain lady appears at it with her bread-platter.

A correspondent of 'Science Gossip' says of a tame sparrow, 'With the time of the meals it is perfectly acquainted, and does not fail at breakfast, dinner, and tea to announce its presence by knocking with its beak at the window until it is opened for its entry.' Dr. Carpenter is responsible for a story about certain sparrows that frequented a young ladies' boarding school at Bristol, and that knew twelve o'clock on week days—the hour and days on which the girls ate their luncheon in the play-ground, the dropped crumbs from which luncheon became the food of the birds. They gathered on the garden walls a little before twelve, and waited till the playground was empty of girls, when their

own feast began. This incident contrasts with the other, first mentioned, of the sparrows and other birds that were candidates for the morning charity of a lady in Edinburgh. In the latter case the pensioners, who were as regularly expected and provided for as various human pensioners by the same benevolent heart, showed their confidence in her, their absence of fear, by feeding in her presence.

Ducks, dogs, donkeys, and many other animals are similarly regular or *punctual* in their attendance at man's *dinner* hour.

Macaulay mentions a Newfoundland dog that visited a baker every morning, save Sunday, as the clock struck eight. One of the commonest tricks which the dog is taught is to *call* (or awake) its master at a fixed hour in the morning.

The mules employed in loading and unloading vessels on the quays of New Orleans know the duration of their work—the length of time, the number of hours, during which they are called upon to labour—neighing to their masters as a signal when it is time to be unyoked (Houzeau).

A London barrister—one of the staff of a well-known provincial newspaper—told me of a certain cat of his that used to meet him *regularly* at a certain hour on a certain road, on his way home from office. In such a case as this it is difficult to resist the conclusion that it must have had some means of *reckoning time*. Wild dogs in Peru meet at certain hours, at certain places, for certain purposes (Pierquin). The tame orang has, or gets into, regular hours for going to bed at night and rising therefrom in the morning (Houzeau). Blind beggars' dogs visit church-doors at the proper hours (Low).

It has been alleged by Houzeau—with what degree of truth does not quite appear—that certain hours are observed by the cock in its crow, whether it be light or dark—in other words, that unnatural and artificial continuity of light or darkness does not affect its *periodicity* of work and rest. Statements, however, of an opposite kind have been made, and are much more probably true. It has been abundantly proved, indeed, that artificial light and darkness produce certain curious results that are to be considered *errors of*

instinct. Various birds can be easily deceived by artificial reversal of the natural phenomena of light.

The *duration* of a master's sleep is estimated, and correctly, by certain sporting dogs and by some birds, such as the hornbill; and if he oversleep the usual time, they *awake* him: thus the tame hornbill awakes its master for breakfast (Houzeau).

Certain clever, trained dogs have been described as having a knowledge of the hours on the *watch or clock*—as being able to indicate the hour by reading the dial of either or both (Watson). But there is obviously no necessary connection between such a feat and that calculation of time—whatever be its nature—by which so many of the operations of domestic animals are regulated.

There is at present no evidence to show whether the dog or other animals can count in any way, or otherwise distinguish, the different hours struck by a clock, which would involve the faculty of numeration.

Without rigidly observing certain hours, there are various animals that do certain things in the morning, at noon, and in the evening, at dawn or sunrise, and at sunset or the approach of night. Wherever dairy cows go to and from pasture in summer, they may be observed gathering themselves spontaneously at sundown at or near the gate of their paddock, waiting to be let out in order to go to their byres for the night. I have seen this over and over again myself—indeed, sometimes daily during the summer months.

Equally noticeable and notorious is the noon exodus of dairy cows from a certain town common in my own neighbourhood. The animals do not require to be collected or called; they collect themselves at the proper time and find their own way home. In both these cases—of noon and sunset migrations—the animals may be guided by the light or heat proceeding from, or by the position of, the sun—when there is a visible sun to guide them. But this explanation scarcely suffices, considering that (1) the habit is a daily one, not determined by or depending upon sunshine; (2) in so murky, changeable, pluvious a climate as that of Scotland brilliant sunshine is not a common phenomenon

even during summer; while (3) there are other possible explanations—in the observance, for instance, of circumstances that mark the proper times for going to or returning from grass.

A hedgehog on board ship crept into its box 'at dawn and came out at dusk' (Mrs. Mackellar). Here there seemed to be a direct connection between its behaviour and daylight. Houzeau mentions a hen that, with her chickens, crossed a stream twice a day—morning and evening—to reach a certain feeding ground.

Periodicity of action, and the estimation of time, are not confined, however, to the observance of certain hours, or of morning, noon, and evening, or of given days in the week. Of a certain foxhound Baker writes, 'I am convinced that he knew the *date* of a track from its appearance'—that he could determine its *age*. The ladajac reaps its grain and dries its grain stores at the proper time (Houzeau). Butchers', bakers', and newsmongers' dogs and horses pay periodical visits to the residences of their masters' customers, without direction (Watson).

Many dogs especially have been described as knowing the *days* of the week. But such cases almost invariably resolve themselves into a distinction of *Sunday* from other week-days, and occasionally of Saturday as a precursor of Sunday. That these days are regarded as the first, or sixth or seventh of each week there is no ground for believing; but the dog has no difficulty in recognising Sunday at least as a holiday, marked by certain things that man does and does not do. It is keenly observant of the cessation from ordinary work, of the household hush of the Day of Rest, of the church-going and all it implies—such as its having to keep the house. To it the day is what it is to so many children—a pre-eminently dull day in Scotland, where it does not get its usual walk or run, and does not, unless in pastoral districts—as explained in another chapter—accompany its master.

A dog belonging to a certain grocer in Edinburgh accompanies him regularly in his week-day walks, but never attempts to go out with him on Sundays. The church bells,

the not going to shop, its master's change of dress, the later hours of rising and breakfast, the greater quiet of house and streets, all guide it probably in distinguishing the Sabbath from other days of the week. The raven in Shetland does more harm on Sunday than on other days, because the human inhabitants are regular church-goers, and the birds know that almost nobody is left behind to hinder their depredations (Saxby).

Rooks and crows show similar fearlessness, security, or boldness on Sundays (Watson). Macaulay mentions a dog that visited a baker every morning save Sunday; on that day it never made the attempt; and Dr. Carpenter tells us of sparrows that made a similar omission in their otherwise daily visits to the playground of a Bristol boarding school, the pupils of which had early lunch indoors on Sundays. In both cases the obvious cause of the omission was the same—the knowledge that on Sundays nothing was to be had to repay a visit, the baker's shop being closed in the one case and there being no bread-crumbs in the playground in the other.

The dog is liable to commit *error* as to particular days of the same kind that man makes under the same circumstances. Thus it commits a very pardonable mistake when it confounds *fast* days in Scotland with Sundays (Watson), inasmuch as children, and even adult men, are constantly doing the same.

Several instances have been recorded of dogs secreting themselves on *Saturday*, so as to avoid being tied up on Sunday; and in such cases they may arrive at their knowledge of Saturday from their observation of the same kinds of signs that mark off Sunday from other days in the week. Saturday, in this country at least, is usually a half-holiday, marked by cessation from ordinary work and by engagement in various forms of recreation or of preparation for the Sabbath.

Dr. Carpenter mentions a dog keeping out of the way on the days—once a fortnight—on which it was accustomed to be washed—an operation it specially disliked. Here again it may have learned the washing days not by counting every

fourteenth day, but simply by observing the earliest preparations for its bath. Its periodicity of action may have been determined simply by periodicity of action in its master or mistress.

Dogs distinguish certain other days of a season such as Christmas, assize or cattle-killing days, hunting days (appointed for the 'meets' of hounds), and in general all *holidays* or other days marked by unusual events—by any departure from the routine of daily life. In all these cases they probably observe man's preparations for the business or sports of the day, more especially perhaps his change of *dress*. They readily distinguish Sunday clothes from a hunting costume, and both from the ordinary working day habiliments: they quite understand the object of such changes of dress, and their association of ideas enables them to connect evening in-door full dress with balls or parties, or the scarlet coat and top-boots with the hunt, as well as with the fact that, when dressed in a particular way, and when going to a particular place, they may, or must not accompany their masters. Their behaviour is in accordance with their logical inferences from observation: they exhibit indifference or sulkiness in one case, joy, friskiness, vivacity in the other.

The power of the dog, horse, mule, donkey, elephant and other animals to count or reckon, in some way, intervals of time, and the exactness of their reckoning are illustrated in many other ways: for instance, by their punctuality and *regularity* in betaking themselves to, and relieving each other from, duty—in taking turn and turn about at work.

In various ways, certain animals show that they can correctly calculate or estimate space or *distance*, including height. The horse, for instance, in the steeple chase or hurdle race, calculates hurriedly the *height* of the fence he is about to leap; the dog does the same when he is invited to jump through a hoop for a bit of bread; the lion and other predatory carnivora estimate both height and distance in their contemplated spring upon their prey. Certain fish are called shooting or *archer fish* from their precision of *aim* in bringing down flies on the wing, by squirting at them drops of water, the nicest calculation of the intervening space, as

well as of the size of their prey, being involved. They learn by experience to make due allowance for the refraction of light by water; to use their natural weapon, the syringe, in the operation of squirting; and to employ water as an effective kind of shot, missile or projectile (Houzeau). But the archer-fish, in the precision of its aim, makes allowance, not only for the refraction of light and for distance: not only for the size, but also for the movements of its victims (Baird), while the dog and other animals make proper allowance for wind and water currents. The elephant makes a similar use of his trunk as a syringe or hydropult, and of water as a projectile: while it also estimates distance and size in the occasional punishment of his human tormentors. Both in the archer-fish and the elephant, calculation of distance amounts to, or involves, an estimation of the *range of projectiles*, as well as of the force necessary for the projection of missiles.

Many animals learn by experience the average or maximum range of man's projectiles or explosives, of his firearms and their contents, especially: and they have or acquire the sense to keep for their own safety beyond range. They calculate this range with great nicety in certain cases. Thus the dog in a farrier's smithy will be found sometimes just far enough from the forge or furnace to be beyond danger from fire sparks, but yet sufficiently near to get the full benefit of the grateful heat. The crow and other birds dread man within rifle range, if he carries a rifle; but are perfectly unconcerned if they keep and feel themselves beyond bullet reach.

A *calculation of range* is implied in various devices of the fox, or other animals, for bringing their prey within capturing reach. There is correct judgment of distance in the feints of a partridge; as well as of time in relation to space in the journeys of Texan cattle to their watering ground. They time their setting out according to the distance they have to travel (Houzeau).

There is even a nicer calculation of time and space in the robbery of the fish hawk by the eagle ('Percy Anecdotes'). In the Arctic bear, which kills the walrus by rolling down

upon it rocks or stones (Hall), there is estimation of height or distance, as well as curve, and perhaps *impetus* or momentum. Walruses themselves 'notice exactly the direction and distance of their enemy (man), and emerge at the spot to meet and destroy him' (Koldewey); that is, they observe his exact topographical position, and calculate how far they must swim under the ice, so as to reach him.

Certain animals, also, form their own estimates of *weight*, resistance, impetus or momentum, and size. The elephant must calculate weight or *resistance* in judging of the degree of strength it must put forth to move a timber log or other heavy object: for in all such cases there is a due adjustment of an animal's force, strength or power, to the physical character of the object to be pushed, lifted, carried, or piled. The ant probably makes a similar calculation when, meeting with a large, heavy, dead beetle, it calls in the aid of its fellows to roll, carry, or push it to the nest. The same animal shows its knowledge of *dimension*, of length and breadth, of the smallest diameter of an object—in the conveyance of booty, or in the dismembering of prey (Houzeau, Watson).

Horses, mules and camels measure or estimate the *size*, as well as weight, of their loads, so as to judge of the possibility of their passing through forest openings, gates, or doors, or of their own ability to bear them with comfort.

Tame working elephants are in Ceylon employed in a considerable variety of engineering works. In arranging timber, for instance, the animal balances the logs in its mouth, steadying them with its trunk, places them in exactly parallel rows, or in superposition, rolls or pushes them with its head or foot, checks any undue 'way' or momentum by its trunk, expresses dissatisfaction at any irregularity, and readjusts until the desired position is attained, and all unaided or undirected (Baker). Such operations necessarily involve not only great variety, but great nicety of calculations. It balances water pipes, lays and fits them into each other (Watson); it applies its strength at the proper time and in the proper place ('Animal World'). It reaches coin, when it is tethered, by blowing at a certain

angle, so as to produce a recoil of its blast which brings the coin within reach of its trunk.

By their combined efforts at mechanical labour, moreover, ants act upon the principle of *union* or aggregate strength (Watson).

The use of *counterpoise* is seen occasionally in spiders, for instance when they suspend from one angle of a web a small fragment of stone, to keep it on the proper stretch. Thus a correspondent of 'Nature' describes one as having suspended to its web a fragment of gravel as a movable weight, to counteract the effect of gusts of wind. The rose-leaf-cutter bee fixes pieces of rose-leaf to her cell, 'solely by calculating upon the natural *spring* of the leaf, and so adapts the pieces that the middle one always overlies a join in the others' (Milton).

Dogs at least calculate and make allowance for the *rapidity* and *strength* of *currents* of rivers and tides. Thus Wood describes a miller's dog that, to save a drowning small one, ran by the side of a certain river till it 'got well below the drowning dog:' then it sprang into the river and swam across: 'and so exactly had he calculated the rapidity of the river, and his own speed, that he intercepted the little dog . . . . and brought it safely to land.'

The old mare or cow forms very shrewd estimates of *weakness* in, discovers the weak points of, a fence that debars access to tempting fodder (Macaulay). The dog and other animals form estimates both of *their own strength* in relation to size of body, and that of their fellows, so as to judge, for instance, how far they can cope with them as rivals or enemies. Hence they acquire a consciousness of great superiority of size and strength, which probably leads the large powerful dog to decline fighting with a small weak one, a phenomenon usually attributed to a display of magnanimity. They become aware when they have met their 'match;' when honorable and equal combat may be the result. And in other cases, they are convinced of the futility of effort, of the inadequateness of their strength.

The horse and other animals of burden compare their own strength, or physical agility, with the size, weight or

height of objects they are called upon to surmount or carry. Hence the horse refuses an impracticable fence, recognising its impracticability: it does not attempt what is beyond its power, what is obviously dangerous. Its reluctance, in such a case, may, or may not, be overcome by the will and stimuli of the rider, the whip, the spur, the taunt; or by the force of imitation, the example of other horses and riders. The animal's own better judgment may be made to give way to the temper and insistance of its master. But if, and when this takes place, it is too frequently proved by the issue that the horse has been the more sensible animal, indeed, the only sensible animal, of the two: though unfortunately it is also the more likely to suffer for its rider's stupidity than the rider himself. The camel, too, shows unwillingness to travel with a load which it considers too large or heavy.

But the dog at least is capable of estimating not only the physical, but the *mental or moral* qualities, both in his fellows, and in man. It is frequently an admirable reader, or interpreter, of *human character:* it forms a wonderfully correct judgment of man's strong and weak points; in other words, it rapidly discovers those weak points in regard to which it feels itself to be, for the moment at least, man's superior. In particular it recognises, and it must be added, it sometimes takes undue advantage of, such human qualities as timidity or hesitancy, ignorance or inexperience; just as it does of man's drunkenness, awkwardness, incautiousness.

Nor does the horse, in some cases, form a less accurate estimate of certain features at least of man's character. In their own fellows, in their leaders or chiefs, or in their prey or enemies, dogs, tigers and other animals, appreciate such qualities as courage, sagacity, presence of mind and fertility in resource.

There is the same liability to imperfection, or *error*, in the calculations of other animals as in those of man. Thus errors in the calculation of distance occur frequently in the leap of the predatory carnivora on their prey.

The Indian cheetah, when it makes a premature dash at the antelope, and so misses it, 'sneaks ashamed and crest-

fallen to the nearest bush or nullah, and snarls with sullen and bitter rage, when the attendant approaches to recapture and blindfold him.'[1]

Birds of prey often 'miss their mark' in a similar way. Thus a merlin, in pursuit of a sand-piper, missed its quarry, and 'the merlin by the force and impetus of its flight plunged, head over ears, into the sea, whence, with draggled plumage and brine-blinded eyes, it arose with difficulty,' its intended victim of course escaping (Stewart). The supposed unerringness of aim of the shooting-fish of Java is as great a mistake, on man's part, as is his belief in the 'unerring' development of animal instinct in so many other directions. Though the archer-fish generally brings down its prey, it does not do so always or necessarily. 'If this fails . . . . he repeats his circuit of observation, pauses, again apparently to measure his distance, and then discharges at the fly once more.' He uniformly *surveys* his prey first, swimming about so as to examine its exact position.[2]

A Skye terrier sitting at an open window on the third storey of a house, in one of the streets of Edinburgh, saw its master pass on the street below. Its master very foolishly beckoned to it; the poor animal, literally not looking before it leaped, taking no time properly to calculate height or distance, acting impulsively, rashly, thoughtlessly, without reflection, jumped downwards, with sufficient force to clear a sunk area in front of the house, but only to impale itself on the railings that fenced in the said area from the street.[3] A due consideration of the nature of the feat it was about to perform would probably have prevented any attempt being made.

There is *miscalculation* of the power of successful defiance, an utter disregard or ignorance of their relative strength, in the bravado of small and weak, before large and powerful animals, even where the smaller and less powerful animal

[1] 'Daily Telegraph,' November 19, 1875, describing the Indian Sports of the Prince of Wales.

[2] 'North British Daily Mail,' December 8, 1875.

[3] 'Scotsman,' May 31, 1875.

possesses the attribute of courage; in the case, for instance, of the dog braving the tiger (Watson).

In age and disease, mental and bodily, there is frequently a *loss* of the usual power of measuring distance or height, or of estimating an animal's own strength, or other ability, physical or mental: the consequence of which is *self-injury* in various forms and to various degrees.

CHAPTER XXIX.

COURTSHIP AND MARRIAGE.

THERE is a striking resemblance between courtship and marriage in the lower animals and in man; almost every phenomenon in the latter has its exact counterpart in the former. Mating or pairing in other animals, and the preliminary operations—including the peculiarities of what is variously spoken of as the 'season of love,' or the breeding season—furnish illustrations of the most important kind of certain of the mental and moral qualities of the lower animals. These features in their mental or moral character include more especially

1. *Preference* or choice in the selection of mates by the nubile females.

This, again, involves—

a. Deliberation—the consideration of the qualifications of candidates.

b. Testing comparative qualifications by a sort of competitive examination; sometimes—

c. Decision; or, on the other hand—

d. Indecision, vacillation, or hesitancy—not knowing her own mind—in the female.

e. Change of mind or fickleness.

f. Caprice or whimsicalness.

g. The development of singular, perhaps unaccountable, likes and dislikes.

h. Fastidiousness.

2. The paying and accepting or refusal of addresses or attentions by and from the male.

3. The deliberate display to the greatest advantage

of personal charms by the *male*, which involves on his part—

a. The study of effect.
b. Intention, with a definite end in view.
c. Effort to please—including gallantry.
d. Knowledge of the value of—
  1. Beauty of form, colour, or song—
  2. Physical strength and courage.
e. Rivalry or competition, with its attendant passions—jealousy, anger, pugnacity, and their results.
f. The eagerness or ardour of sexual love, which is apt to become excessive or morbid.
g. The exhibition of antics and foolery of various kinds.
h. Love of admiration and approbation—including vanity and dandyism.
i. The estimation or calculation of advantages.

On the part of the *female*:—

j. Appreciation of—
  1. Physical and mental excellence; and of
  2. The desire to please.

And on the part of *both* sexes coquetry.

4. The holding of ceremonies and assemblies—involving fixation of time and place.

5. The modes of expressing affection or endearment—especially by mutual embrace or kissing.

6. The dominance of a master passion and its results—including infatuation or fascination, as well as other changes of character or disposition, temporary or permanent.

7. Constancy and inconstancy in love and the conjugal relationship—including the formation, keeping, and rupture of engagements, profligacy, prostitution, seduction and desertion.

8. Conjugal happiness and unhappiness, with their causes.

9. Occasional assumption by the female of male prerogatives.

The most noteworthy point in connection with the

mating or pairing of the lower animals is the *choice* of a mate so frequently made—for instance, among birds—by the female. This choice is determined in some cases, just as in woman, by *caprice*; it is impossible to give any rational explanation of the preference made. But in a much larger proportion of cases than in woman the selection made is, or appears to be, determined by reasons that are not only intelligible but commendable. These reasons include, for instance—

1. The personal beauty of the male—the gorgeousness of his plumage more especially.

2. The charms of his song.

3. His physical strength and, associated with it, his courage, his ability to protect and provide for his mate.

4. Other physical characters—such as size, form, and colour peculiarities.

5. His sagacity and experience, or other mental or moral qualities or acquisitions.

The female frequently exercises the utmost *deliberation*—involving perhaps caution—in her choice of a mate. She reviews the personal advantages of her male suitors. The female bird obviously looks, in the first place, for a congenial helpmate and protector—a male whom she can at once admire, trust, and respect; and it were well if womankind were always as judicious in their principle of selection, where any principle is at all adopted. No doubt in certain cases and senses the choice of the female animal may be said to be determined by a consideration for her personal comfort or interest—in other words, by *selfishness*. Nevertheless, whether or not the principle of selection be considered a selfish one, its beneficence cannot be doubted: the results of such selections are, on the whole, good. It may happen, however, as in woman, that the excellences, whether mental or physical, which the female animal sees in her suitor, are apparent rather than real; that she deceives herself, and perhaps, like her human sisters, 'marries in haste and repents at leisure.' This is only tantamount, however, to saying that the frequent and serious *errors* of animals, as of man, extend to matters amatory and matrimonial.

The *preferences* displayed in courtship are more frequently or more generally exhibited by the *female* than the male animal (Darwin). The common cock, however, chooses young hens; he shows the same sort of natural preference that man so usually does for fresh, youthful attractions. On the other hand, the partiality of the cock pheasant is for old hens (Darwin); so that in the amatory and matrimonial affairs of other animals, as in those of man, most fortunately no doubt, *de gustibus nil disputandum.*

But deliberate choice or selection is by no means confined to love affairs. It is constantly shown, and in a great variety of ways, by the lower animals—quite as much at least by the males as the females. Thus it is shown in the following important particulars:—

1. The preference of duty to revenge, to pleasure, to personal ease or gratification—in other words, of the right to the wrong; or, on the contrary of—

2. The expedient or politic—whether or not it is also wrong—to the right; of selfish considerations to self-sacrificing benevolence.

3. Preference of immediate and certain death by suicide to the probability of prolonged life and torture; or of death to the desertion of their young by mothers; or in many other cases—

4. Choice of the lesser of two evils or dangers.

5. Partiality for human society—shown by so many birds and other animals.

6. Likings or dislikes for or to particular animals, persons, places, things, sounds, and colours—including favouritism as to companions or playfellows, masters or mistresses, nesting or building places, and the materials of construction; especially the

7. Predilections shown by so many animals for particular foods or articles thereof—for instance, for those used by man, including cooked foods and intoxicating beverages.

8. Preference of liberty or freedom to captivity or confinement; but, on the other hand, a singular deliberate—

9. Selection of captivity and its advantages in preference to a wild life with its risks.

10. Selection of proper articles by dogs or other animals that act as man's messengers or servants, or that perform on the theatrical stage.

11. Choice of the best means for the accomplishment of a purpose.

Choice, however decided it is when made, may not be made at once. As in man, wary, experienced animals feel or know that there are many things to be calmly considered before their mind is made up to any given line of action. They estimate, calculate, or weigh risk or danger; balance disadvantages and advantages against each other; 'count the cost' of a proposed procedure, anticipating the results—deducing consequences from their causes. They exercise or manifest comparison and reflection. In so simple a matter as the selection of one of several roads the dog, for instance, makes unconscious use of a syllogism (Houzeau).

On the other hand, there are unfortunate animals, as there are unlucky men, that cannot make up their minds or come to a decision; that cannot show a rational preference, or a preference of any kind, even in matters seriously involving their own personal interests. In such cases *indecision*, the incapability of making a distinct choice between two courses of action or things, or between action and inaction, is apt to be as fatal to the animal as to the man. Belt, for instance, gives the case of a mule crossing a ravine: 'When it came near to a place where it could escape the deep mud by going over a stony part, it would slacken its pace and look first at the mud and then at the stones, evidently balancing in its mind which was the *least evil*. Sometimes . . . . it would be so undecided which side was the best that, making towards one, it would look towards the other, and end by getting into the worst of the mud. It was just like many men, who cannot decide which of two courses to take, and end by a middle one, which is worse than either.' The typical and familiar ass between its two bundles of hay graphically represents both the state of mind and the action or inaction of such vacillating mules and men alike.

Preferences, even of what appear to be of a singular and unnatural kind, are determined sometimes in all probability

by motives that are *intelligible and rational.* Thus there are many animals that, having tested for themselves the relative advantages and disadvantages of freedom and captivity, deliberately submit themselves to the latter. No doubt they usually do so in the pleasant form of mere domesticity, which allows frequently considerable freedom of action. Wild animals that have been made captive and subsequently released have voluntarily returned to what were virtually their former prisons and prison-life, having probably learned by ample experience how hard was the struggle for life in freedom, the natural state, with its worries, exposure, and want, and how pleasant the protected artificial life, with its abundant feeding, secure protection from dreaded enemies, and absence of all care.

The choice of a *minor* rather than of a *major evil* is also quite intelligible and rational. There are many birds and other animals that regard man as an enemy, and under ordinary circumstances avoid him as such; who nevertheless fearlessly seek his protection when a more relentless enemy appears—a more immediate or certain danger threatens. Thus various small birds pursued by hawks fly precipitately into man's or woman's very bosom. Belt mentions a cockroach which, fleeing from him, encountered a spider, when 'back it would double, facing all the danger from me rather than advance nearer to its natural enemy.' There can be no difficulty in understanding, moreover, the occasional decided preference shown for *man's society* over that of their own species by dogs and various birds. Man can, and does, give them what their own species cannot, while, generally speaking, access to their own species, when desired, is at the same time not prevented. He furnishes at once shelter, protection, food, and companionship, perhaps he reciprocates their affection, gives them that for which they long—sympathy and love.

On the other hand, preferences that are utterly *unaccountable* on any rational ground, and that yet can scarcely be denominated capricious, are illustrated by the common cases of dogs attaching themselves to masters who are cruel to them, and maintaining their allegiance after a long course

of neglect or ill-usage. Inexplicable attractions are not however more common than inexplicable repulsions or antipathies—a subject that falls to be considered in the chapter on 'Individuality.'

It is quite relevant to, or in connection with, the subject of courtship and marriage to refer to some of these *demonstrations* of affection or attachment which in the lower animals are humanlike in their character. The most important are the kiss, embrace, and caress.

The operation of *kissing*, or some equivalent process, has been described as practised by a considerable number of animals—including, in the first place, various quadrumana, such as the chimpanzee, orang, and various baboons; the dog and cat, horse, cattle, sea-bear; cockatoo and other birds. In some cases the operation would appear to consist simply of the fond rubbing together or touching of mouths, lips, noses, or beaks, and in no case is there, so far as I am aware, exactly the same kind of smacking of the lips that occurs in man. The significance of the process, whatever be its nature, which is necessarily determined by the structure of the animal, is the same as in man; that is to say, that, while usually an expression of endearment, it may also be one of simple salutation or greeting.

The sea-bear of the London Zoological Gardens used to try to kiss its keeper, the French sailor Lecomte; and I have myself seen a horse do the same in a circus or hippodrome. In both cases it was attempted at the command of their masters, and by the touching of noses or lips. Wood describes a cat kissing a dog; 'she greeted him with a kiss; literally, they touched lips and noses.' And there can be no doubt about the dog offering its caresses, in the form of lip or nose-touching, as well as tongue-licking or touching, to man. Berkeley speaks of a greyhound 'covering him with kisses.' A cockatoo is described, on the other hand, as soliciting by word and action a kiss from a long-absent mistress (Wood). The amicable rubbing of noses by cattle, donkeys, or horses over or on different sides of a hedge or fence is a familiar spectacle in country districts. Horses express familiarity with each other by mutual rubbing of noses (Nichols).

If it should be objected that their rubbing of noses has a very remote resemblance to human osculation, we have only to remind the reader that among certain savage races of man the rubbing together of noses is the mode of greeting uniformly adopted, obviously taking the place of the kisses that are so common in various civilised people, such as pre-eminently the Germans and French.

This appears to be the proper place also to take some note of *æsthetic perception* in the lower animals—of their taste for the beautiful, of their appreciation of harmony, whether in form, colour, or tone—a subject on which no man has written so much or so well as Charles Darwin. First, then, it has to be remarked, as regards man, that—

1. The æsthetic sense is by no means common. It is indeed frequently wanting (Nichols); while, where it is present in certain savage races, it is frequently inferior in its character to that which occurs, for instance, in many birds.

2. There is no uniform standard or criterion of taste, differing as it does in different races, peoples, and countries, and as it has done at different epochs of human history or in different stages of civilisation. Hence it is that what is by one people, or at one time by the same race, considered beautiful or tasteful is regarded by or at another as quite the reverse.

It does not follow, therefore, that the lower animals have the same ideas of the beautiful that civilised or savage man has. But that their conceptions, frequently at least, coincide with those of man is proved by their admiration of such magnificent plumage as that of the peacock's tail when expanded. In other cases there is an admiration of the same forms, patterns, or colours as by man (Darwin). Æsthetic taste in the lower animals includes a love of—

1. Novelty.
2. Variety.
3. Fashion.
4. Ornament or finery.

And it is exhibited in various forms of—

1. Artistic skill—for instance, in the decorative arts, as well as in the—

2. Display to the best effect of graces of person—including the colour of plumage.

In birds, as in man, it would appear to be the *female* that most frequently and decidedly manifests a partiality for finery and fashion, for self-decoration (Houzeau), for the ornamentation of love-bowers, or other places of rendezvous, or of nests (Gould). Even among humble bees there are artists with a taste for the ornamental (Figuier). Sir John Lubbock refers to the obvious 'evidences that the beauty of flowers is useful in consequence of its attracting insects.'

Certain birds *cultivate beauty* of person, just as man, or more commonly woman, does; and some mammals do the same—polishing their fur, for instance, as birds preen their feathers. Moreover, taste for the beautiful is improved by being exercised or cultivated in birds as in man.

Various birds and other animals not only appreciate beauty in each other, but they are conscious of the existence and of the value of their own personal beauty. They take a pride in it, displaying this pride in a variety of ways; and so far as concerns courtship and marriage, they make use of it as a means of charming or attracting the opposite sex. Their pride is obviously associated with, if it do not arise from, their *love of admiration* and their capacity of inspiring admiration. Nor is it at all necessary that this admiration should proceed from other individuals of the species to which an animal belongs. The peacock, according to Wood, 'seems to be just as proud of the admiration bestowed by human beings as of that offered by his own kind.'

The turkey, in his nuptial plumage, 'surveys himself with ludicrous complacency.' The whidah (or widow) bird is also 'wonderfully proud of his beautiful tail' (Wood). The bird of paradise makes his morning toilet very carefully, cleansing his plumage, and 'seeming proud of its heavenly beauty, and in raptures of delight with its own most enchanting self.' One of them inspected the state of its plumage above and below, 'as proud as a lady in her full ball dress . . . . looking archly at the spectators, as if ready to receive all the admiration that it considers its elegant form and display of plumage demand' (Bennett). Here,

says Wood, is '*pride in personal appearance* developed as strongly as it could be in any human being. Moreover, the bird could sufficiently enter into the feelings of the spectators to understand that they were admiring its beauty, and to exult in the admiration.'

Associated with *vanity* there is sometimes a great susceptibility to *flattery* in many parrots and cockatoos, that at once, when asked by man, expand their wings so as to show off their beauty and size ('Chambers's Journal'). Self-conceit is occasionally such as to lead to sad self-deception, to delusion, and even to fatal disappointments—as, for instance, when animals believe their personal charms to be irresistible.

The necessity for the presence of *spectators*—and for *admiration* on their part—is as obvious frequently in the love or other exhibitions of various birds or other animals as in man or woman. In the case of courtship there is an ulterior object in view, but in other cases there is none—or at least none intelligible or apparent—beyond the admiration called forth, and the homage thereby paid to self-esteem. Chillingham bulls perform their duels before cow spectators, just as human rivals figure at a tourney (Aylmer). The mandrill, drill, and other baboons or monkeys display their coloured nates, and if this display be 'made before two observers, they turn to him who seems to pay the most attention' (Von Fischer). They require admiration as much as does the girl-child who shows off her last new frock or doll. There is a necessity for the *appreciation of effort*—the trouble bestowed on which is regarded as thrown away if the effort itself be not duly observed, or, if observed, not duly appreciated.

Many animals solicit, and some of them *demand attention* or recognition from man; and though this is not always with a view to his admiration of themselves, or their offspring, or the doings of either, the procedure very often appears to have such admiration as its immediate or ulterior object. Certain birds and other animals even enforce attentions from each other—for instance, females from males. The canary does so imperiously and effectually with her beak; and it is pro-

bably to this sort of operation by female birds, jealous of, or longing for, masculine attention, that we owe the phrase so commonly applied to certain human husbands, of being 'hen-pecked.' So necessary are respect or attention from man to certain irritable, jealous house pets, or menagerie captives—such as the felinæ—that dangerous fury is apt to be excited in them by his simple indifference.

Many birds and other animals take every *pains* to ensure *success* in the display of their charms before the other sex, or in efforts of whatever nature. They have a keen enjoyment of *triumph*, and they celebrate victory, whatever be its nature, in a variety of ways. There is the sense of triumph, the air of triumph, the strut of triumph. But, on the other hand, there is corresponding soreness or disappointment at non-success; and *failure*, according to its nature, may even beget melancholia, abstinence, marasmus and death.

The efforts of a male suitor to please or charm the female to whom he pays court are not always received favourably. On the contrary, his amatory attentions may be received with disdain, anger, violence, or other forms of repulse; and unfortunately, one of these forms of 'rejected addresses' is cannibalism—the devouring by the female of her lover. Thus we are told that the 'female spider is, in many of the species, much larger than the male. And a very remarkable danger attends the amatory approaches of the latter—as, if they are not favourably received, he is not uncommonly killed and eaten on the spot' ['Chambers's Encyclopædia']. 'Disappointed affection' is probably as common in other animals as in man, 'jiltings' by the fickle fair quite as frequent.

In some cases the *refusal* of the attentions of the male by the female may be altogether, or in some measure, his fault. Thus young males are apt, as in man, to be forward, officious, troublesome, impatient, over eager, unduly amorous; and this eagerness may even be morbid in its excess or nature, leading to persecution of, and danger to, the female selected for their attentions.

In such cases it is not surprising that such addresses should be avoided, repulsed or punished. But in other cases

there seems to be nothing lacking on the part of the male, whose qualifications as a suitor, and whose mode of paying his court, exhibit nothing that can reasonably be objected to. Nevertheless, the female 'will not when she may;' and her declinature can only be ascribed to *caprice*—to some causeless antipathy to the suitor, or to some equally unaccountable preference for an indifferent, non-competing stranger.

Hence it happens that, in other animals as in man, the course of 'true love' does not always run smoothly. There is no accounting for the love vagaries of the female, who sometimes pays the penalty of old-maidism for her capricious rejection of eligible offers of mates. For the same reason—the caprice of the female—bachelorhood is sometimes compulsorily inflicted on the male. As in man, bachelorhood and old-maidism may arise from unattractiveness in either sex, from incapacity in the one to charm the other.

The delays and vagaries of love frequently arise from fastidiousness on the part of the female. There is difficulty, perhaps impossibility, in pleasing her; and this may not be confined to lovers or mates, but may extend to food, home, associates, master, and 'things in general.' This fastidiousness has been specially noticed in the bitch (Walsh); but in her and other female animals it is frequently, at least, to be regarded as morbid. As a cause of love-delays or errors, it is, however, intelligible. But caprice often defies all attempts to understand or account for it. And it is far from being confined to love affairs, extending also, as it does, to nesting places—for instance, in the martin (White)—to friendship, and to many other of the ordinary affairs of life. Whether or not it is more common, it has certainly been, like fastidiousness, much more commonly noted, in the *female* than the male; and the presumption is that in the one case, as in the other, it is to be regarded as a *morbid* peculiarity of the female.

But celibacy, neither in female nor male, is always thus compulsory or fortuitous. It would appear, in some cases at least, to be voluntary and deliberate—in the case, for instance, where obstacles arise to the gratification of a special choice.

The *duration* of courtship in birds is liable to the same variations as in man. It may be short or prolonged, rapid or dilatory; there may be 'love at first sight,' leading to or ripening speedily into matrimony; or the female may be 'ill to please and hesitant in making up her mind'—more probably as to the merits of rival candidates for the favours of love than as to marriage itself. The rapidity of the process of wooing is most marked in the re-marriage of widows; perhaps, also, of widowers, though in their case the phenomenon certainly has not been so frequently noticed. The widow, however, manages, in a marvellously short space of time, to make known 'to all whom it may concern,' or perhaps to some favoured male, the fact that she is once more in the matrimonial market, again ready to become the prize of gallantry, valour, symmetry or song, as the case may be. There is sometimes the same unbecoming unceremoniousness, the same 'hot haste' after a bereavement, that attends occasionally, or leads to, the second nuptials of those who ought to be, according to etiquette, 'inconsolable' or 'disconsolate' young widows among mankind.

Under whatever circumstances the *marriage* tie is contracted, its obligations are not always held sacred, any more than in man. Among birds especially there are 'gay' males or females that boast of their success in gallantry or solicitation. There are profligates and prostitutes; illicit as well as legitimate amours; conjugal infidelity and desertion; seductions and elopements; marital quarrels of all kinds; and not unfrequently the summary punishment of marital offences. But, on the other hand, the affection of the lover or the mate is frequently marked by the utmost delicacy, sincerity and constancy—for instance, in the warbler and dove.

As in man, it is usually the male who courts and the female who is courted. She is passive, except in the important matter of choosing or accepting a mate; while he has all the fatigue, anxiety, and danger of the love antics or dances, and of the fights, which so frequently characterise animal courtship. There are exceptional cases, however, in which, just again as in mankind, the *female* not only takes the initiative, but plays the whole game. For instance, court-

ship of the males by the females occurs in the cassowary (Darwin). Where she plays the part of the male throughout, she exhibits all the worst of his passions, such as rivalry, jealousy, and ferocity. This rivalry and jealousy lead to frequent battles for the possession of the male—just as is more commonly the case among males for the capture of the female. The struggles of these Amazon rivals are sometimes characterised by the same mercilessness that is exhibited when the furious male is the combatant; and the ferocity displayed is occasionally such that death is the result in the unsuccessful.

By no means unfrequently the females take the first step in love-making by their solicitation, by the various wiles they practise on impressionable males, which are the same in character as those so familiar in their human sisters, and the object of which wiles is the same in both cases—the attraction of the attentions of the males.

CHAPTER XXX.

FOSTER PARENTAGE.

THE phenomena of foster-parentage offer many interesting illustrations of the mental and moral aptitudes or qualities of the lower animals. The adoption of the young, not only of the same species, but of other species and genera of the most diverse structure and habits, is common under certain circumstances. The most common of these circumstances is the non-gratification of the imperious maternal instinct—the same cause that leads so many spinsters of certain age to console their idleness with pet dogs, cats or birds, or so many childless couples to adopt children in order to gratify their parental longings and inherit their wealth. It is, therefore, usually the *female* that becomes a foster-parent, and takes home to her affections, and to her board, the young of her neighbours, and failing them, or otherwise by singularity of preference, the offspring of other species or genera. There are many instances of hens hatching ducks' eggs and bringing up broods of ducklings, of geese tending ducklings, of cats nursing each other's kittens, and of a whole host of other birds hatching the eggs of the cuckoo. But much more interesting are such cases as the following:—

1. Cats and bitches suckling each other's whelps (Houzeau).

2. Cats suckling or bringing up young squirrels, dog-pups, chickens, rats, and leverets or young hares—all their natural prey or enemies (White).

3. Bitches suckling young pigs, kittens, or panther-cubs (Jesse and Jardine).

4. Hens rearing kittens, of which an instance has been

given me by a relative, or other birds sitting on dog-pups.

And still more remarkable is the occasional suckling of individuals of *more than one species* at the same time by the same mother, as in the case of a cat that tried to suckle chickens along with her own kittens.

The most common cause or motive that leads to the adoption of the young of other animals is the loss of a mother's own young, and the felt necessity of gratifying her bereaved maternal instinct. So strong, so urgent, so irresistible even, is this necessity, that it leads occasionally to the *abduction*, or theft, of the young of other animals. No doubt the result is usually beneficent, so far as concerns the up-bringing of the abducted young, seeing that the self-constituted foster-mother lavishes on them all the care she would have bestowed on her own. Nevertheless, there is a selfish disregard of the feelings of the other and true mother, who is bereaved by such an abduction.

Sterility—the want of offspring—operates in the same way as bereavement or loss of young. The female of mature age, whose longings for progeny have not been gratified in the natural way, takes the only means that remain to her of so far satisfying her paramount desire to have some of her own species on whom to lavish her overflowing affection.

This sort of what may be called *vicarious maternity*, this assumption of the duties of a mother, is not always confined to the female. There are occasional exceptional cases in which the *male* takes a female's place in the hatching and up-bringing of young, whether its own or those of other species or genera. Thus we are told of a male turkey hatching duck's eggs.

Generally speaking, the adoption of foster-young is *voluntary*; the foster-mother is self-elected. But in some cases the bringing up of the young of other species or genera is involuntary or *non-voluntary*; or at least there is no spontaneous selection, either of the maternal office, or of the objects of affection; for instance, where young are deserted, orphaned and cast upon the care of sometimes an *unwitting*

foster-mother, as by the cuckoo—or where orphaned, lost or deserted young seek the good offices of some other mother than their own.

There are several other circumstances under which foster-mothers act as such unwittingly, ignorantly, exhibiting therein grave *errors of the maternal instinct.* Thus certain birds sit on 'dummies,' on stones or other inanimate objects, on the eggs or even the young of other species—all substituted experimentally by man for their own eggs or young, without their ever detecting the deception. Not uniformly, however, do they betray such ignorance and error. Romanes mentions a Spanish hen that, disappointed in the gratification of her maternal instincts by being placed upon 'dummies,' after losing patience at the absence of the expected result, 'turned foster-mother to all the Spanish chickens in the yard,' of all ages, but only to those, be it observed in this case, of her own breed—Brahma and Hamburg chickens not being adopted with the others.

In the case of a cat recently confined, two young squirrels were artificially substituted for two kittens that were killed: the cat did not notice her loss—that is to say, at first. For sooner or later in such cases the development of the natural instincts of the foster-young—climbing trees and eating nuts in the case of young squirrels—taking to the water in the case of ducklings, gives rise to unbounded astonishment and alarm in the foster-mother. When a hen sees the ducklings hatched by herself taking to a horse pond, she gives no uncertain signs of her surprise, concern, dread of, or at, their —by her supposed—singular behaviour; and she feels sadly puzzled and annoyed at her inability to follow them upon their natural element. Foster-mothers, therefore, may and do undertake duties of the nature of which they are ignorant, and for the results of which they are unprepared.

The Ettrick Shepherd tells us that a mother sheep, deprived of her own young, will take to suck the lambs of another mother if clad in the skin of one of her own dead lambs. 'She accepts and nourishes it as her own ever after' —not detecting the imposture. But what is more curious, for some days at first, the deceived mother 'shows far more

fondness by bleating and caressing over this one than she did formerly over the one that was really her own.'

In some cases the foster-mother devotes her whole attention to her foster-young, if the latter are of the same age and of the same species. In other cases the foster-mother has young of her own, in which case the adoption of the young of other individuals, species or genera, is usually the result of compassion and over-flowing motherly love, not of an ungratified maternal instinct. In such cases, cats and other animals make no invidious distinction of the adopted strangers; the orphaned or deserted offspring rank *pari passu* with her own in the affections of the foster-mother.

As a general rule, foster-parentage, the assumption of a mother's duties, the adoption of young, whether orphaned or deserted or not, developes all the finer traits of the maternal character—constancy and intensity of affection, unremitting attention, lavish generosity, touching tenderness, self-sacrificing devotion. Foster-parents sometimes die, sacrifice themselves, in the discharge of their self-imposed duties, e.g. the lark (Buffon). Low tells us of the tenderness of a bereaved bitch to her foster-young. The female elephant allows herself to be suckled by other youngsters than her own, an illustration of maternal generosity (Houzeau); and the same is done sometimes by the dog and cat.

But, on the other hand, a selfish, rigid, and jealous *exclusiveness* may be exhibited, as when a cow repulses the calf of another cow.

Instances of indifference or cruelty are commonest, in other animals as in man, on the part of *stepmothers*—and, unfortunately also of fathers at the instance of stepmothers. Thus Watson mentions the ill-feeling of a turkey stepmother to her adopted young, and the resultant merciless treatment—the father becoming indifferent or unnatural in his affection, perhaps under his second spouse's malign influence. A common form of a stepmother's unfair treatment of her adopted young is her selfish exclusion from her affections and attentions of all offspring not her own. It may be, Watson suggests, parental affection that leads the widower swallow to provide a stepmother for his brood; and we know

that this is usually the assigned motive, under similar circumstances, in man. But unfortunately neither in men, nor among other animals, does the experiment usually prove fortunate, so far as concerns the happiness or comfort of the first young family.

It happens, occasionally, that *more than one* foster-parent or mother takes a fancy to a young brood, under which circumstances quarrels for exclusive possession of the envied treasures might be expected to occur, and probably do occasionally occur. But on the other hand, and on the contrary, these competing foster-parents find it to be equally their interest and pleasure to co-operate in tending a group of young, adopted by both. Wood tells us that a widowed goose, 'without encumbrances,' took a fancy to a brood of ducklings that had previously been adopted by a hen. A mutual arrangement was arrived at whereby the hen tended the brood on land, and the goose on water. But the hen does not seem to have been contented with this division of labour and love, and a further arrangement was entered into whereby both foster-mothers could follow their darlings on water as well as on land. The plan adopted in regard to the water was that the hen should sit on the goose's back while she swam about after and among the ducklings. This Wood expressly describes as 'a fact,' and not 'a solitary event,' for it continued to be repeated day after day, till the ducklings were old enough not to require the care of either self-appointed guardian.

Some animals—such as young cuckoos—regularly stand in need of the services of foster-parents in their up-bringing; they are brought up, if at all, by mothers of some other species or genus (Baird). In their case there is a systematic baby-nursing by some other bird. The mother-cuckoo 'boards out' its nurslings; she transfers the maternal duty of rearing her young to some willing or unwilling stranger foster-mother; she shirks and escapes from what appears to be a troublesome, though natural, duty; and all this has its parallel or counterpart in the behaviour of too many ladies of fashion in America, France and England, who devolve upon others some of the perhaps irksome duties of their own maternity.

But there are other and more legitimate or commendable forms of *boarding out* the young by certain animals. Thus the effect of the experience of kind treatment of its kittens by a human mistress has led a cat in a subsequent confinement to quarter one kitten after another on this human foster-mother, to leave them as foundlings at her hearth; a kind of desertion of offspring, dictated by no want of natural affection, but apparently by the same kind of policy that leads so many poor human parents to agree to the adoption and up-bringing of one or more of their loved young by some wealthy and childless, but kindly, widow or couple. A cat of feeble nursing power carried her kitten to another feline mother, who at once, for friendship's sake, or from a liberal maternal love, accepted the new and additional duties imposed upon her (Wynter).

One of the most interesting forms of foster-parentage is the tender *nursing* of human *children* by the elephant (Watson), horse, and dog. Such nursing shows that there is no necessary impossibility or improbability in human children becoming sometimes foster-young to beasts—such as wolves—in the so-called 'Wolf-children' of India, for instance, being really tended, as story reports, by forest wolves.

Just as there is so frequently a transfer of maternal love to the young of another individual or species, so there is a much more natural and intelligible, an easy and rapid, transfer of *filial* affection and attachment on the part of foster-young to their foster-mother. There is a very natural and intelligible reciprocity of affection: the young that are so lovingly catered for, fostered and cherished, respond to all this care and attention as they would have done to that of their own mothers, provided these mothers had displayed a natural kind or degree of maternal solicitude.

But there are other results in the foster-young that are of even greater interest and importance, to wit—the acquisition of *habits alien to the species or genus*—of the habits of the foster-parents—an acquisition begotten either by mere imitation and association, by special training, or by both. The same thing happens when an animal from birth is brought up exclusively with companions of a different species or genus.

FALLIBILITY.

CHAPTER XXXI.

LIABILITY TO ERROR.

One of the commonest popular attributes of that comprehensive faculty in the lower animals, which, when contrasted with human reason, is generally described as *instinct*; that quality of instinct, which is perpetually brought into greatest and admiring prominence by writers, especially of the theological or pietistic class, on the marvels of the animal economy, is the unerringness, *infallibility*, perfection of instinct. But it is a fact utterly fatal to such a view of the infallibility of animal instinct that the lower animals make mistakes; they exhibit errors both of omission and commission, of the same kind, under the same sort of circumstances, as numerous and varied in their character, as man himself does, or as those of man are—that is to say, they are such as man commits, or would commit, under similar circumstances. So infinite indeed, both in number and variety, are the proofs of the *fallibility* of what is absurdly, restrictively called instinct in the lower animals, that it is impossible, in the present work, to do much more than merely catalogue and comment upon a few illustrations.

Among errors may perhaps be regarded the *non-variation* of instinct with circumstances, the want of adaptability to external or surrounding conditions, that characterises certain animals, such as beavers and monkeys in artificial confinement.

The mistakes of other animals, as of man, are mostly attributable to—

1. Thoughtlessness, *ignorance*, or inexperience, as these are embodied in youth; or they belong to the category of—

2. Errors of *judgment*, discrimination, or discretion, in maturity; or, they arise from

3. Natural *stupidity*, or the various forms or degrees of mental defect or derangement.

These errors may be classified in various ways, arranged in various natural groups. Thus in reference to the *kinds* of error, which are also *causes* thereof, we may consider separately and specially errors of—

1. Observation: such as identity or resemblance.
2. Way-finding.
3. Calculation of distance, size, height, time, position, motion.
4. Imitation and mimicry.
5. Weather-knowledge.
6. Curiosity, or inquisitiveness.
7. Attention.
8. Interpretation, inference, or conclusion.
9. Covetousness, or acquisitiveness.
10. Imagination.
11. The senses: vision, smell, hearing.
12. Reflection.
13. Caution, haste, eagerness, impatience.
14. Impulse and impulsiveness.
15. Temptation.
16. Providence and forethought.
17. Prudence and policy.
18. Confidence.
19. Memory.
20. Affection or attachment.
21. Fidelity and obedience.
22. Self-sacrifice and generosity.
23. Selfishness and self-preservation.
24. Gratitude and respect.
25. Habit and discipline.
26. Will and self-control.

27. Instinct.
28. Panic, fright and fear.
29. Combativeness and temper: obstinacy.
30. Rivalry and jealousy.
31. Destructiveness.
32. Perseverance, pertinacity, importunity.
33. Supposition and causality.
34. Suspicion.
35. Delusion.
36. Dreaming and sleep.
37. Wildness.
38. Civilisation, or domesticity.
39. Language, knowledge of words and their signification.
40. Feeding and appetite.
41. Intoxication.
42. Sexual passion or lust.
43. Pairing.
44. Pregnancy and parturition.
45. Incubation.
46. Cleanliness.
47. Construction, and constructiveness or ingenuity: as regards material, form, locality.
48. Domicile or shelter.

The mistakes of animals may also be divided into those characteristic of youth, maturity, and age; or into those which affect species, such as the bee, or dog; or into those which are—

1. Natural, excusable or *pardonable*, as the fruit of ignorance; and those that are—

2. Inexcusable and *punishable*, sins against knowledge—of the nature, in other words, of crime; or into those that are—

3. Capable of ready explanation as to their obvious causation; and those that are—

4. Unaccountable, incapable at present of satisfactory explanation; or into—

5. Errors of health and disease, mental and bodily, including all the stages of debility.

There are certain disadvantages, as well as advantages, from arranging the errors of the lower animals under such heads as have just been given. And indeed, the disadvantages so preponderate over the advantages, that it is preferable not to fetter ourselves by, or to, any given *classification*, because it will soon appear obvious that any one animal, such as the bee, or dog, may commit errors referable to a great many categories or classes; while any given error may involve observation, judgment, reflection, memory, and a number of other mental qualities. Moreover, there are whole groups of mistakes that cannot as yet, or at present, be properly explained, though they may become quite capable of explanation when the errors of the lower animals have attracted the kind and degree of study that they deserve.

Not only, however, do animals make mistakes innumerable; but they themselves discover, or *detect and rectify*, their own mistakes, while they notice equally those of other animals, and of man himself. There is, in the first place, a consciousness, recognition, or perception of error, which frequently leads to an avowal or confession of it in the form of shame, chagrin, or self-blame. This *sense of error* is often followed by efforts at rectification, by obvious and earnest desire to make amends, or atonement. There may be at first but a *suspicion* of error, which begets expressions of anxiety and distrust, and leads to *investigation*, inquiry, or examination, testing or experiment; and the latter process, which may be very cautious, careful and thorough, usually leads to conviction, either of error, or of freedom from it. As in man, this *correction* of first errors is the result, usually, either of:—

1. The use of other *senses* than the one originally at fault;

2. The acquisition of *experience*; or

3. The application of judgment, involving reflection, comparison, the sense of the relation of cause and effect, and other mental qualities assignable to the domain of *reason*.

The parrot, and other birds, make 'false notes' in song; but they immediately recognise their blunders and correct them ('Percy Anecdotes'). Dray horses and mules fre-

quently damage their loads at first; but, gradually profiting by experience, they correct their early errors of simple inexperience (Houzeau). Chickens arrest themselves in the very act of error and avert it (Spalding). Colonel O'Kelly's famous parrot, if it mistook, in beating time, a note in music, 'would revert to the bar where the mistake was made and correct itself.' Similarly, the parrot corrects its own errors in speech. There is a speedy *discovery* of error in ants that have mistaken seeds for larvæ, or beads for seed (Moggridge).

The recognition and rectification of error in the dog includes the discovery of its own, and of its master's blunders in the game of dominoes (Watson): and even the correction of its own mistakes in grammar or orthography, composition or spelling, by the trained transposition of painted or figured words, or letters. Its consciousness of error, moreover, is frequently expressed by what may literally, as well as figuratively, be called its shamefacedness: its sense of blunder often developes a keen feeling of self-accusation, which leads to its retirement from its accustomed haunts—especially from man's observation.

In other animals, as in man, the discovery of error may be *too late* to admit of its rectification, as in the case of Mrs. MacKellar's fox-terrier, that surreptitiously dropped fish back into the water as fast as they were caught by his mistress, and apparently discovered his error only when no more fish were caught.[1]

Even the most sagacious animals are sometimes led, by their unsuspiciousness or inexperience of man's treachery or trickery, into error *at first sight*, as in the case of menagerie elephants at first mistaking stones for nuts. But the *discovery* of the deception is speedy, and the results of that discovery sometimes serious to the perpetrator of the cruel practical joke. The musk-ox commits an error in the interpretation of sound when it fails to distinguish a rifle report from thunder. It shows, however, a speedy perception of its mistake, correcting it by the application of other senses or sensations—of sight and scent (Richardson).

It does not, by any means, follow that where error is re-

[1] 'North British Advertiser,' January 23, 1875.

cognised it is avowed and amended; on the contrary, in highly sensitive animals—such as the dog—the fear of human ridicule, the dread of detection by a master or mistress and of punishment following detection, lead to various efforts at the *concealment* of error, from at least human eyes.

Thus a terrier that had worried a toy (imitation) cat, 'finding we were laughing at his discomfiture,' tried to make believe that 'it had only been a sham fight from the beginning,' thereby 'evidently wishing to hide his mistake:' an action that was 'very human,' as 'it behaved just as a clever child might be expected to do, when it had been deceived, and was afraid of ridicule' (Wood).

It has been already stated that animals are ready to detect the blunders of their fellows—the old, for instance, to notice the faults of the young; and one result of this is, that those which have the power *punish* the generally younger individuals, or smaller and feebler animals, that commit these mistakes.

Thus ants not only detect, but punish for mistakes. Other animals, like man, have, moreover, to pay the *natural penalty* of their mistakes: experience—a knowledge of the means of avoiding, or of correcting error—has to be purchased sometimes at heavy cost. The recognition of errors in offspring, and the consequent chastisement of the young, for their faults of omission or commission, are more fully treated of in the chapters on 'Law and Punishment,' and on 'Education;' while the question of responsibility to, and punishment by, man, is discussed in those on 'Moral Responsibility' and on 'Crime and Criminality.'

The *mental means* by which the discovery of error is made are obviously the same in the lower animals, and in savage or civilized men. Mistakes can be *detected* and corrected only by the use of *reason*. When it is defective or deranged, there is an incapacity for discovering, and consequently for amending, error; seeing that, where it is not perceived, or found out, error cannot be rectified. Hence many animals exhibit a peculiar liability to error without being at all aware of its commission, without having any

conception of its nature, and without, therefore, any effort at self-extrication, or at remedy. They are perpetually blundering without being conscious they are so doing; they are not led by experience to the correction of their mistakes. Such animals are the subjects either of a congenital *stupidity* —of mental defect, or of disorder of the mental powers subsequent to birth.

On the other hand, just as there are individuals peculiarly stupid in the detection and remedy of blunders, there are others that are peculiarly *clever*, or intelligent. These clever individuals display a singular freedom from the commission of mistakes, as well as a marked quickness in their discovery, and ingenuity in their rectification, when committed. In other words, they seldom blunder, but when they do so, they seldom fail speedily to detect and correct their error.

The recognition of *man's* errors may be supposed to imply a higher degree of intelligence than the detection of their own mistakes, or those of their fellows. Such recognition includes a detection of various *impostures* or deceptions practised on other animals by man: a subject more fully alluded to in the chapters on 'Deception' and 'Practical Jokes.' 'Learned' dogs, that play dominoes with him, express, by their gaze, their recognition of, and surprise at, man's errors in the game, when he makes any (Watson).

The *causes* of error in the lower animals may be either:

1. Obvious; or

2. Discoverable only on close inquiry, or adequate research; or they

3. Are not at present discoverable or demonstrable at all.

They may also be either real, or merely apparent: and investigation may be necessary to discriminate between the apparent and real. And further, they may be simple or complex, and *trivial* or inadequate, disproportionate to the result, or *vice versâ*.

The *triviality* of the causes of error is sometimes very remarkable. This is illustrated by certain mistakes regarding *identity* of person: as when a dog does not know its

own naked master, who has gone to bathe, leaving his clothes in his dog's guardianship. Some very ludicrous incidents have occurred from this kind of stupidity and fidelity: when a dog refuses to permit the bather's clothes to be touched by their own proprietor, not recognising him *in puris naturalibus*. Here change of dress—or what is equivalent—absence of his master's usual garb, is the simple and obvious cause of the dog's mistake. Something analogous occurs in the case of newly shorn, or washed sheep, which are not at first, or readily, recognised by each other, so that there is always, for a time, great confusion of personal identities among sheep, after their clipping or dipping (White). On the other hand, some fatal accidents to man have occurred from this combination of stupidity and fidelity in the dog. Simple *haste* in not taking time to make sure of their identity leads the dog to attack, with equal fury and determination, supposed or imaginary, and real strangers or enemies (Pierquin).

'There is no more horrible, and at the same time, authentic dog-story, than that of the huntsman, who, hearing a tremendous yelping in the kennel one night, went down in his shirt, with his double thong in his hand, to quell the disturbance. But the hounds did not recognise their master without his scarlet coat, and they literally ate the huntsman up.'[1]

Various birds break their eggs, or destroy their nests when either have been simply meddled with (Houzeau). The mere soiling of the young is a cause of dislike to them on the part of the mother guinea pig (Cassell)—an error surely of over-cleanliness.

The following are illustrations of errors, the causes of which are at present *problematical*. We can only make guesses at them.

1. Salmon killing themselves in myriads, by leaping on dry land—jumping 'out of the frying pan into the fire.' Probably they are pursued, in such cases, by some formidable and relentless enemy.

[1] 'Daily Telegraph,' October 7, 1874.

2. The dog that rolls itself in putrid carcases only attracts flies to torment it (Houzeau).

3. Lemmings drowning themselves in vast numbers.

4. Midges, butterflies, or other insects immolating themselves in flame.

5. And a host of other cases, some of which are enumerated in the chapter that treats of 'Unsolved Problems in Comparative Psychology.'

The errors of animals are constantly *taken advantage of*, on the one hand by each other, and on the other, by man. In particular, these mistakes are of great practical importance to man in the capture of animals, for his various purposes. Mistaken *confidence* in man is fatal to many birds and other animals. The whole system of *decoy*, as used by man in the capture of animals, is based on their liability to error. The song bird, in listening to, and following man's 'calls;' the wild duck, or elephant, that allows itself to be lured by the trained decoy; the emu, that is deceived by the Australian black, who imitates its appearance and gait; the fish that fails to distinguish the real from the artificial fly, or that is fascinated by the glare of some artificial light —commit errors of observation, attention, or reflection, or all three—errors that subserve man's purpose in their capture.

Monkeys that are trapped or captured by means of monkey-pots—the seed vessels, or fruit, of a large Brazilian forest tree—sacrifice their liberty or life to their errors of over-eagerness, want of reflection, greed or stupidity (Buckland, Hooker). This occurs only, however, or mainly, in the *young* and inexperienced. When tempted with cocoa-nut shells filled with rice, the unwary animals insert their paws, fill them with the rice, and not having the sense to extricate their hands by simply emptying and straightening them, or resolved not to part with their booty, which they hold in the fastest grip, literally and figuratively they are obliged to drag about the heavy, cumbersome, full nuts, which become impediments of so serious a kind to progression, that the easy capture of the greedy, stupid animals is the result.

The natives of the Fiji, and other South-Sea Islands,

when they desire to catch land crabs—that climb cocoa-nut trees, to bite off the nut, in order that they may feed upon it when it falls to the ground—tie a wisp of grass round the trunk of the tree at a great height from the ground. On his way down the tree, after effecting his object, the unwary crab 'as he feels the wisp of grass, *imagines* he has reached the ground, lets go his hold, and falls to the bottom,' when he becomes the prey of the ingenious natives (C. F. Wood).

In many other ways, mistakes are frequently serious, *dangerous*, or fatal, either to the animals themselves, that commit these mistakes, to their fellows, or to man. Injuries to *themselves*, or to each other, include—

1. The self-immolation of midges or moths in flame.

2. The accidental self-destruction of birds, that dash hurriedly, unexpectedly, and with great violence against glass, or telegraph wires.

3. Death from exhaustion, or inanition, or both, in deer, oxen, and other horned animals from the interlacing of their horns in fight. The poor animals become inextricably fastened to each other, so that they can neither eat nor drink, can do nothing, in short, but slowly die of starvation. The dead bodies have been found, with the horns still entangled; or the living (or rather dying) animals have been seen, standing helplessly, face to face with each other and with death—having given up all struggle, in exhaustion or despair—emaciated and famished to the last degree, but yet unable, from the peculiarity of their position, to lay themselves down in their weariness—even to die.

Injuries to *man*, on the other hand, include, for instance, the accidents arising from shying, or bolting, in carriage or riding horses.

CHAPTER XXXII.

COMMISSION OF ERROR.

AMONG the most frequently quoted examples of 'unerring instinct,' guiding actions or operations superior to those which result from human reason, is the cell-making of the *bee*—that 'busy bee' of which Dr. Watts sings, and which has for ages been held forth to admiration by writers of the theological and moralising school. It is, however, one of man's numerous errors to suppose that the bee constructs its cell or its comb with 'unerring wisdom.' In point of fact it frequently makes mistakes, constructing cells of improper size or thickness of wall, so that the comb totters or falls at its weakest point. The error, however, is usually recognised; the weak points are supported by buttresses, and in any further constructive operations a similar error is avoided by the same animals that committed the mistake, which animals, in other words, have *profited* by their *experience* and exhibited *reason*. There is, therefore, occasional faulty construction of the honey-comb in the direction of weakness and overloading. Waste of material, or the improper use of material, or the selection of unsuitable material, for constructive operations is not confined to bees. It is shown, for instance, by certain birds and other animals. Irregularities in the cells of bees are not, however, necessarily errors or imperfections; they may be the result of *calculation*, and therefore of *intention* (Huber).

Bees commit many other kinds of error. Thus Alphonse Karr asserts that bees will not alight on the bee orchis, 'believing it to be occupied by a fly,' one of the results of vegetable mimicry. And other insects seem to commit the

same mistake; for we are told that this bee orchis (*Ophrys apifera*) is singular, in so far as it 'is one of the few plants of its order that appears to be perpetually self-fertilised, never being visited by insects' (Brown). Erasmus Darwin seems to point to something similar in the case of the South American *cypripedium*, another orchid, which resembles a spider. In a similar way bees are deceived by *painted representations* of flowers (Millais), as well as by the *artificial flowers* of milliners. They knock their heads against glass, the physical shock producing unconsciousness (Watson)—the result of not discriminating between an open and closed window, the presence or absence of glass. Many birds do the same thing, and suffer the same kind of accidents—in their case frequently fatal.

The humble bee lays eggs sometimes only to be devoured, and it brings up—ignorantly—the larvæ of intruders. This is a non-recognition by them of parasites or usurpers, leading to their giving a friendly reception to impudent, self-invited guests that foist themselves or their progeny into the nests of other species or genera, just as the cuckoo does with her eggs. The queen bee commits various errors of *hurry*, haste, or precipitancy, but they are rectified by her attendants (Figuier).

The bee and other animals are liable to deception in the same way, if not to the same extent, that man is by supposed premonitions, or by semblances, of storms. That is to say, they commit errors of *meteorological prescience*. Especially is its foreknowledge of, and provision against, *rain* liable to be faulty in the bee, which dislikes wet, and avoids it where possible. Some worker hive bees having deprived themselves of a queen, and no royal larvæ being in process of development to replace her, 'tried to obtain a queen by treating drone (*male*) larvæ in the usual manner, of course without effect' (Carpenter). The queen bee sometimes makes the fatal mistake, too, of laying her eggs at random (Huber). Lubbock gives numerous instances of bees, as well as wasps and ants, *losing their way*. He showed experimentally how apt they are to lose their way even in short distances, and

how they require training to find it. They require to learn their way, just as a child or a man does.

The bee is not the only insect liable to error, and we hear so much of the uniformity of instinct in the whole class of the insecta that it is desirable here to call attention to other common instances of the mistakes committed by wasps, butterflies, beetles, and other insect-genera or species.

The *wasp* sometimes hatches her eggs at improper seasons—too early or too late for the development of the young (Houzeau).

The meat or flesh *fly* allows its sense of *smell* to be deceived when it lays its eggs on *stapelia hirsuta*, the so-called 'carrion-flower,' instead of on carrion, the result being necessarily fatal to the maggots (Houzeau, 'Animal World'). The same fly, says Pouchet, sometimes mistakes men drunk-asleep for dead bodies, and deposits her 'blows' on them. Other species of *stapelia*, which are Cape plants, smell so like carrion that flesh-flies deposit their ova in their flowers, the maggots when hatched being starved, of course, for want of suitable food.

Linnæus and Pouchet, again, tell us of the so-called fly-catcher (plant)—the *arum muscivorum*—the flower of which has also the odour of putrefied meat, a smell that deceives flies or other insects to the extent of leading them to deposit their eggs in the flower. The common domestic or house fly sometimes deposits its ova in snuff, mistaking it for poudrette, the result here also being that these ova perish for lack of nourishment (Houzeau, Kirby and Spence). Insects make many other kinds of mistakes in regard to *flowers*. Thus Sir John Lubbock remarks: 'Some flowers beguile insects by holding out the expectation of honey, which does not really exist.'

Certain wood-boring *beetles* dig what prove to be their own graves (Wallace). Advantage is taken by man of the temper, pugnacity, and pertinacity of the tiger-beetle to capture it (Baird).

Foraging *ants* are deceived by the appearance of the leaf-insect, so as not to notice it (Belt)—an error apparently of observation. The same ants in Nicaragua ran over and

about a certain kind of locust, which in its danger remained immovable, and thereby deceived the ants, 'without their ever discovering there was food within reach.' Leaf-cutting ants occasionally carry into their nests unsuitable leaves, such as grass, but these leaves are rejected, thrown out again by the more experienced, so that the error appears to be one of *youth* and inexperience. They also commit mistakes in road-making in unsuitable places—for instance, across tramways—errors that lead to the death of large numbers of them every time a waggon passes. But this is for a time only, till they are taught by *experience* to avoid the danger, while their own reflection and ingenuity, their fertility in resource, enable them successfully to do so (Belt). Amazon ants frequently carry off 'empty shells, carcases, and other useless objects,' in their expeditions against brown ants (Forel). A morbid, mistaken, or misplaced perseverance or pertinacity leads to wholesale waste of life in certain ants (Westwood), just as it does sometimes in individual bull-dogs or terriers.

Gillies gives examples of incomplete or 'bungling workmanship, and consequent weakness,' in the construction of its nests by the trap-door spider of New Zealand. 'What shows,' says he, 'that this is something more than the unerring fatalism of what we are accustomed to call mere instinct, is that instances are found of bad and blundered work of various degrees of imperfection, and even of laziness and neglect.' Thus his attention was occasionally drawn to its nests by the 'prominent unsightliness' of the heaps of unused material accumulated for the purpose of disguise.

We are frequently called upon to marvel at the 'unerring instinct' with which members of a certain breed of *pigeons*, tossed into the air at a given point, distant so many hundred miles from home, make their way to their own dove-cot or master's house in a direct line, and within a wonderfully short space of time. But it has been abundantly shown by Tegetmeier and other competent authorities that this faculty of home-finding or *homing* in the carrier or courier pigeon is the result of careful tuition by man; that it is only exceptionally intelligent birds which are successful in such flights; that

they must use their keen powers of observation of natural landmarks, and hence cannot fly by night or in mist or storm; and that mistakes are constantly being committed by the animals while in process of training, and even after their tuition has been accomplished. If man is not sufficiently gradual in his lessons, if he gives the birds too long flights at first, and especially if he has not been happy in his selection of naturally intelligent animals, capable of repaying his efforts on their special education, they may fail altogether; so that on the occasion of every trial or competition flight, while certain animals reach the goal, certain others do not—a fact familiar to all persons experienced in the pigeon-flying matches of Belgium or other countries.

Other animals take note, and make use of, *landmarks*, and of those, moreover, that are set up by man, as well as of those that are natural. Thus Belt tells us that certain marks, purposely set up by himself in Nicaragua and in the Amazons region of South America, for his own recognition as a means of way-finding, were recognised by certain wasps. They frequently—as perhaps he did himself—missed them; but they repeated their search till they were found.

Again, the stories told of dogs, cats, horses, donkeys, or other animals *finding their way* home over sea and land, through or across unknown districts or regions of both, are not only infinite in number, but frequently apparently incredible in character. Nevertheless there can be no doubt as to the authenticity, in all respects, of at least many of these stories; and this renders it probable that there is some basis of fact in the remainder. But the incidents in question relate to the successful exploits of exceptionally clever animals. We hear nothing of the *failures of the majority*—nothing, for instance, of the number of stray dogs that are constantly wandering in the streets of our cities, and that perish there from cold and hunger; or of wandering sheep and cattle that are incessantly perplexing the farmer, drover, or shepherd.

Much is said of the wonderful, though rare, phenomena of way-finding, nothing of the everyday occurrence of *way-losing*. And yet there is nothing more common than for

dogs to lose their way even round the corner of a street from their master's house—defective observation and reflection being here probably the cause—while no one can have brought up a pup to follow him about town or country without having been subjected to the annoying experience of having constantly to rectify its errors of youthful thoughtlessness, inattention or stupidity, including its loss both of way and of master.

There is nothing surprising in *way-losing* in *young* animals. *Young* hounds lost in sporting make direct for home across fields, but they are stopped by rivers, on the banks of which they sit down and howl their disappointment or their desire for assistance or direction. They have not the sense acquired by experience to use bridges or boats as older ones do (Berkeley). But even the cleverest adult dogs sometimes fail in way-finding in towns: they betray a *stupidity* in this direction that is remarkable in contrast with their high intelligence in other respects, their failure being perhaps attributable to mental confusion from the noise of the streets, to the sameness of the architectural character of these streets affording no distinctive landmark, to diffidence, timidity, or fear (Cobbe).

During the siege of Paris by the Prussians in 1871, the street dogs lost their usual power of way-finding; they showed hesitancy, uncertainty, or dubiety, and held mutual *consultations* under the exceptional and embarrassing circumstances (Gautier). It is no anomaly that a dog will readily find its way in the open country, and as readily lose it in a town—the reason perhaps being the number and diversity of distracting, alarming, or puzzling sights and sounds, the various causes of mental bewilderment—*in cities*. The dog, moreover, frequently commits the error of not taking either the easiest or shortest way, when it finds the way at all.

We have already seen that even the bee, whose bee-line is synonymous with a supposed exactitude, unerringness, directness, loses its way, as does the courier pigeon in its 'races' or matches. The swallow commits similar mistakes (Watson)—another animal whose migrations and other operations are generally regarded as the result of faultless

instinct. Wandering from home is a common expression or result of *disease*—mental or bodily—in certain animals. Thus wandering fits occur in the sturdy of sheep.

The *migrations* of animals are also supposed to be guided by unerring instinct. But in the lemming they lead to the deaths of thousands of animals, of whole armies of emigrants, under circumstances which cannot at present be satisfactorily explained; while the migrations of fish appear to be marked by occasional loss of way, just as happens frequently in the case of migratory birds. In the latter the errors connected with migration include the dashing against lighthouse lanterns and telegraph wires, and shock or death from the concussion. Too early or mild springs in northern climates attract migratory birds, only to die of the later frosts.

The migratory instinct frequently leads to the commission of fatal errors—as in the case of the smelt—'sculls' (or shoals) of which ascend the North-American rivers and streams in such numbers and with such impetuosity as to cause death by the thousand from overcrowding (Adams). The salmon both of North America and Britain make many equally fatal mistakes of a similar kind—in their too eager rush up shallow waters, for instance. In caged migratory birds, at the epoch of the spring or autumn migration, on the other hand, the non-gratification of an imperious instinct often leads to self-destruction, by frantic efforts at escape, and death by exhaustion or self-mutilation.

Nest-building in birds is another of those operations that are supposed to be uniform in each species, and determined by an unvarying instinct. But the fact is that birds are constantly making mistakes either as to the (1) material, (2) site, or (3) mode of construction of their dwellings. Starlings, swallows, chimney swifts, and other birds that frequent man's dwellings, often pay the penalty of nesting in chimneys in use, the object of the birds being apparently the securing of warmth. Death by fire or suffocation is the occasional result of the inflammable material of the nest catching fire. But not only is there danger in such cases to the poor animals themselves. Man himself may be seriously incommoded, as happened to myself on one occasion, when,

under the circumstances above mentioned—the firing of their nests in my library chimney—a couple of terribly singed starlings came out of my fireplace one morning, amid a volume of flame and soot that drove me from the room, and destroyed all its furniture for the time. The bat commits a similar mistake when it hybernates in chimneys in use.

'By reason of their nests being placed so near the water, the eggs are continually swept away' by summer floods in our rivers and lost, to the destruction of the breed, in the case of the common gallinule or moor hen (Montagu). A robin built its nest in a steam-hammer at Hawthorn's engine works, Granton, near Edinburgh, in the very midst of both heat and noise, and of danger to itself and young.[1] The same bird builds also in other odd, *unsuitable places*, where the nest is quite accessible to man—e.g., in man's bedrooms ('Animal World,' White). A fly-catcher built in prickly bushes, and near a wasp's nest, so that in its flight it was entangled in the prickles and stung to death by the wasps (Belt). Watson mentions swallows building repeatedly in unsuitable localities, undeterred by their successive failures, untaught by experience. The republican sparrow, too, commits faults as to position, including height (Houzeau). A correspondent of the 'Animal World' tells us that she saw a pair of swallows engaged in repeated and vain efforts, extending over a whole fortnight, at making their nest 'of damp, partly decayed leaves and pieces of manure, neither of which would adhere to the wall of the house.' They had the sense, however, to use clay, and straws or grass, whenever—after their many failures—these articles or substances were supplied in a proper state of moisture by their sympathising lady observer. It is an error of a similar kind when the beaver selects *improper material* for its dam (Adams), or when a captive one constructs a dam under *unsuitable circumstances*—in its master's study or parlour for instance, where it is utterly useless (Cobbe, Adams).

Moreover, birds mistake their own nests, do not recognise them sometimes—an error that leads to obvious awk-

[1] 'Scotsman,' June 19, 1875.

wardness. Miss Buist tells us of cage birds, that several mates 'confined in a cage waste time, play with and spoil each other's preparations, make mistakes as to which nest belongs to them and which to a neighbour, and if they find eggs where they fancy they left fledglings, or *vice versâ*, they unhesitatingly toss everything out, and march off in high dudgeon to occupy another (nest) more to their taste, no matter whether or not this be already engaged. . . . Of course frightful fights and endless breakages (of eggs) are the result.' Here is indeed quite a characteristic 'comedy of errors'—quite an instructive commentary on the unerring instinct ideas of theologians. Among rooks also there are perpetual fights and wholesale destruction of each other's nests (White).

Field hares and birds sometimes get cut in two by scythes, reaping hooks, or reaping machines, while sitting on or with their young. In such a case the animals may have been too much absorbed in their occupation, or they may have been paralysed by fear, or the sense of danger acting on the maternal instinct may have determined them to stick by their young at whatever risk or cost. *Mothers* sometimes interfere so much with their newly-born, tender offspring as to kill them. They commit a blunder of overfussiness connected with maternal affection. Thus the female *octopus* kills her ova or young by the sheer stupidity of her maternal solicitude, by the excessive and injudicious exhibition of maternal love. She overlays them, and subjects them to other risks of destruction (Lee).

Closely allied to the subject of nest-building is that of *incubation* in birds, another of the operations believed to be guided by infallible and inscrutable instinct. But birds make perhaps more frequent and more marked—certainly more fatal—mistakes in regard to the deposition and hatching of their eggs, than in regard even to the construction of their nests. Their errors of incubation include, for instance—

1. Premature laying or hatching of eggs.
2. The selection of unsuitable places as well as times.
3. The sitting upon the eggs of other species or genera,

as well as upon 'dummies'—inert, inanimate substances, such as stones or imitation eggs.

Hancock tells us that birds 'do not discriminate nicely the colours or other characters of their eggs'—a circumstance that points to deficient power of observation or attention in this direction. Hence probably it is that we hear of hens sitting on and hatching the eggs of other birds, not noticing the difference until the young come forth. But they also sit on, though they cannot hatch from, bodies that bear but a faint resemblance to their own eggs, or to eggs at all.

Thus we are told of a cochin-china fowl sitting for some length of time on two empty physic bottles, and at last requiring forcible removal[1]—a marked instance of error or perversion of the maternal instinct. If the male bird of paradise is killed, 'the female will continue to sit upon her eggs until she is starved to death' (Lawson). Hens may easily be made to sit on 'dummies.' Romanes mentions a Spanish hen of his that did so for three days, 'after which time her patience became exhausted.' He also speaks of a Brahma hen, that had hatched pea-fowl eggs, as deserting 'her family at the time when it is natural for ordinary hens to do so, and in consequence all the pea-chickens miserably perished.'

He refers to a pea-hen that 'sat very steadily on addled eggs for a period of four months, and had then to be forced off in order to save her life.' And he illustrates 'in what a high degree hereditary instinct may be modified by peculiar individual experiences,' by the case of an old Brahma hen that 'for the enormous period of eighteen months remained with her ever-growing chicken,' a foster pea-fowl placed experimentally under her in the egg state; 'and throughout the whole of that time she continued to pay it unremitting attention. . . . So long as they remained together the abnormal degree of pride which the mother showed in her wonderful chicken was most ludicrous.'

A common result of premature *hatching* is the death of

[1] 'Perthshire Constitutional,' November 9, 1874.

the eggs, or of the young, from cold. Some birds deposit their eggs in nests where they will not be hatched (Houzeau). The quail and partridge 'deposit their young, uncovered, on the ground, and expose them to the rapacity of every carnivorous animal that passes' (Pouchet). What is much more strange, though not so serious, hens 'sit' without eggs at all; they strive apparently to hatch *imaginary* eggs—fancy they have veritable eggs under them (Gray), a singular form of self-deception; or they brood when the eggs are not fecundated (Houzeau); or they drop their real eggs from their perch so as to smash them by the fall (Gray), in other words, they sometimes select the most unsuitable localities for incubation.

Such errors of the *maternal instinct* are not confined to birds: they occur—in the care or up-bringing of the young—in all classes of the higher animals. Thus an old terrier bitch, when jealous of her daughter having had pups, appropriated an india-rubber *toy*-dog 'exactly the size of a newborn terrier puppy. . . . . She retired to a dark closet in an unoccupied room, made herself a bed, lay down and placed the artificial puppy in the right position. . . . lavished endless caresses upon it, and evidently felt the sweetest thrill of maternal delight when her licking elicited a squeak from the mechanism inside, which speaks through a metallic hole in the creature's stomach. She is inseparable from this bantling, has rectified the injustice of Fate, and no longer hates her daughter with destructive jealousy.' She 'continued inseparable from her *doll* for three weeks, when, finding it rather tedious to waste her affections on a thing that neither grew nor showed any signs of intelligence, she relinquished the india-rubber puppy to its rightful owners—the children of her master—and is now contented to see her grandchildren playing about her' ('Animal World').

Errors of the *maternal instinct* also include—

1. The abduction of young by sterile females that have no milk on which to bring them up (Pierquin).

2. The mother stork immolating herself with her young—a useless act of self-sacrifice (Houzeau).

3. Cannibalism of the young by the puerperal mother—a

subject again alluded to under the heads of 'Murder' and 'Mental Derangement.'

Another of man's many delusions in regard to the 'instinct' of the lower animals is, that it leads them unerringly to the *food* most suitable for them, and causes them to reject what is unsuitable or poisonous. The truth is, however, that animals frequently make mistakes in food-selection. Darwin points this out as regards—

1. Emigrant domestic animals; and

2. Caterpillars, in which death results from the refusal of their natural food.

The young sheep requires the tuition of its mother in regard to the choice of its food. Unaided, it displays a non-recognition of that which is or would be poisonous; the lamb has a non-discriminating appetite; there is want of discrimination between the noxious and the wholesome—the result simply of ignorance and inexperience. Camels 'have been known to take white stones in their mouths, mistaking them for lumps of salt' (Prejevalsky).

Self-poisoning by noxious food is one of the many errors of youth, inexperience or ignorance, and sometimes of curiosity or cupidity. Fatal accidents occasionally occur in the monkey from its stealing and swallowing poisonous drugs or paints. The young dog chews everything—however hard, innutritious and indigestible. Mice have been killed by eating 'greenbacks' they had stolen and hoarded. The vicious 'native cat' of Australia drowns itself in its greed (Baden Powell). Montagu mentions a shrike 'killed by swallowing too large a quantity of mouse fur which it could not eject.'

I have elsewhere shown how common accidental suicide by self-poisoning is in some of our colonies, from the use by cattle and sheep, as well as by man, of noxious plants or fruits.[1]

In connection with the subject of *food errors*, it has also to be borne in mind how common are the mistakes arising from simple *repletion* with even good and suitable food—from engorgement of the stomach in voracious animals—a proce-

[1] *Vide* 'Bibliography.'

dure that may be, and frequently is, fatal to life or liberty, either by reason of—

1. The immediate or direct effects of the distension of the stomach on the animal economy; or

2. Indirectly by causing the drowsy, sleeping, or helpless animal to fall a prey to its natural enemies, including man.

Many habitually voracious animals die of fatty degeneration—the result of over-feeding and inactivity, as in man. The immediate effect of over-eating, of gorging to repletion, is the production of a kind or degree of *stupor*, or semi-stupor, that leads to the easy capture of the helpless or unconscious animals. The condor, by its gluttony, begets in itself a state of stupid insensibility, of somnolence or stupor, of inability to move or escape, during which it may be seized with the lasso, or death itself may be the direct result of its surfeit. The special fondness for apples in the cedar bird, and the repletion which ensues whenever any opportunity occurs of gratifying its appetite, render it easily seized by hand (Houzeau). The boa (serpent) is, however, a more familiar instance of gorging to stupor. Loss of liberty, then, is one of the least, most immediate, and direct of the penalties that result from the stupefaction and immobility produced by food-gorging.

Among errors of food-selection may be classed *cannibalism*, as illustrated by a perch swallowing its own eye when the eye was hooked out and both fish and eye were thrown back into the water. Such errors include also the multitudinous phenomena of *morbid appetite*—a subject, to discuss which a special chapter would be insufficient, and to which special attention cannot be directed in the present work.

Perhaps there is no more ridiculous, but at the same time common, error in other animals or man than the venting of annoyance, irritation, temper, passion, on the unoffending, unconscious, *inanimate instruments* by which injuries have been inflicted. The man who stumbles unexpectedly over his boot, shoe or slipper angrily kicks it to a distance as if *it* had been to blame for an accident attributable to his own carelessness and want of observation.

Of the Maoris, Colenso tells us—'Their keen, uncontrolled

feelings often led them to beat, kick and strike inanimate objects, sometimes to their own greater hurt; and commonly to gnaw and bite, on extraction, a splinter or thorn which had pierced them.'

It is quite as obvious a folly in the dog or other animals to vent their displeasure on inoffensive objects (Mrs. Lee). The dog bites or barks at the trap in or by which it has been caught; it snaps at the stream of water from a syringe, hydropult, or hose, by which it has been drenched. It is a common error of *carnivora* to bite or kick inanimate bodies that hit them instead of the persons by whom these bodies have been thrown. The antelope uselessly vents its fury upon the ground, tearing it up with its horns. But very much the same thing occurs in children, savages, and even, as we have seen, in mature and civilised man—in the form of the angry kicking or throwing away of stones or sticks tripping them, or of inflicting blows upon articles against which they have stumbled.

One of the most illustrative examples of the folly of pouring out the vials of wrath on unoffending, inanimate objects, is a story current in Kamtschatka, and which has given rise to a well-known Kamtschatka proverb—of a bear that hugged a kettle of boiling water with which it had scalded itself (Cassell). I have seen the incident described both as an actual occurrence and simply as a story. The anecdote requires verification; and meanwhile it may be regarded as the figurative basis of the moral that both in other animals and man an individual has frequently only himself to blame for his misfortunes. It may be what is virtually the same story —told in a different form—which represents a horse, that thrust its nose into a boiler, and so scalded itself, pouring out its vengeance by furious kicking on the metal utensil.

A chimpanzee bestowed its anger on an unoffending article of food offered to it instead of some other kind it specially desired. A baboon that had been fighting with a tiger, and was at last forcibly removed from the tiger's cage, and so prevented venting its spleen on its enemy, viciously bit the bars of the cage itself (Jamrach)—in order to the relief of its passion.

CHAPTER XXXIII.

COMMISSION OF ERROR (*continued*).

THERE is a whole group of errors of sufficient interest to require special consideration—those connected with the confounding of *resemblance with reality*. They include mistakes connected with—

1. Mirrored images.
2. Pictorial representations.
3. Other representations—such as animal-like toys.
4. Stuffed animals or their skins.
5. Shadows.
6. What have latterly been called the natural 'protective resemblances,' or 'disguises,' of plants and animals.

The dog or parrot, that sees its own image reflected in a looking-glass, naturally mistakes that image for another individual of the same species, who may become its rival or playfellow; and equally naturally, if it be an intelligent animal, not morbidly irascible, it goes to the other side of the mirror in order to find its *alter ego*. The result is usually a varying degree of bewilderment, with perhaps repeated attempts—by re-inspection and re-investigation—to explain the puzzle. It may go the length of *experiment*—pawing, or hitting at, its image, and finding simply a non-retaliating surface and a figure that repeats provokingly and exactly every movement and even look of its own.

The dog, for instance, puts to the test the exact nature of the puzzling image by one of his modes of experimenting —by sniffing at it—by smell. He does not long remain deceived, because he corrects the error of his vision and imagination by his sense of smell; he trusts at all times more to

the latter than to the former sense. The Mexican parrot, on the other hand, is deceived only when it is freshly caught or inexperienced (Houzeau).

The kitten plays with its own mirrored image. But the result is very different in some other animals. Immediate and intense pugnacity is more frequently developed. It was so, for instance, in the case of a common Australian parrot, into whose cage I caused to be introduced, for experimental purposes, a small hand-mirror, while a nut was given it to eat. The effect was immediate. There was no wonder or hesitancy, no investigation or fear, no curiosity, no desire for companionship. The animal at once violently and viciously assaulted its own image, and, failing to produce any injury on the smooth, hard surface of the glass, and on the mirrored image that reflected all its own violence in look and action, it seized the edge of the mirror with its bill, attempting to break it.

The fighting fish of Siam, too, is so irritable in temper that it 'will even butt against its own shadow in a looking-glass.' The sight of this supposed other individual creates as much excitement and pugnacity as the presence of a real opponent would do (Baird). The goat does the same thing —butts at its own mirrored image ('Percy Anecdotes').

The Elizabethan poet, Chapman, speaks of elephants shunning

> . . . . . clear springs
> Lest they behold their own deformities
> And start at their grim shadows.

On the other hand, the mirror is unquestionably used by other animals, as it is by women, for the purposes of *self-admiration*, though even in such cases there is always a danger of the animal's forgetting—if it ever realised—that it is looking only at itself, and of its suffering itself to be tormented with the pangs of jealousy of an *imaginary rival*. Thus a siskin belonging to a friend is fond of looking at itself in a mirror, as so many other animals obviously are, peering, however, behind and over the mirror, apparently in order to see its supposed neighbour. But at last it loses temper, and fights its *alter ego* as the Australian parrot did.

A correspondent of the 'Animal World' thus writes of the effect of a mirror on a parrot; and the incident is here given as it illustrates how cheaply and easily amusement may sometimes be procured for bird-pets: 'She showed such intense pleasure and excitement at her own reflection in a looking-glass, and called so long after it when removed, that I bought a very small one for her and hung it outside the cage at the end of her perch. For a long time she sat with her bill touching this, and making cooing sounds, and still it is the dearest spot in the world to her. She is never lonely while she has that *companion* in the looking-glass. She runs to it with all her joys and sorrows. She rattles the frame and talks to it when her cover is put on for the night. And, if the back of the glass should be turned towards her, she does all she can to set it right. Moreover, at this season . . . . she feeds the children she sees in there. It has attached her so much to the cage that when it is being cleaned she calls loudly for it, and runs to meet it when she sees it coming into the room.'

Pleasure is taken in its own mirrored image by the goldfinch, the result, apparently, of personal vanity (Baird). And other birds frequently gaze at themselves in mirrors, whatever be their motive (Darwin). The orang, too, shows gratification at its personal appearance in a mirror (Pierquin).

It is not a little interesting to note that savage *men*, when first brought in contact with a mirror, behave very much as the lower animals do. Thus, when a jungle Vedda was shown a looking-glass, says Hartshorne, 'he appeared at first to be terrified and annoyed; but afterwards looked behind it and round about in a puzzled and wondering manner, with his hand upon his axe, as if preparing to defend himself. Five or six others to whom the glass was successively shown displayed similar gestures.'

Capt. Moresby tells us that the women of New Guinea 'would start back affrighted on a looking-glass being presented to them.' A correspondent of the 'Scotsman' (newspaper)[1] says of the inhabitants of Fishers Island, in the middle passage between New Guinea and Australia, 'One fellow having got a looking-glass, turned it round and round,

[1] Of July 20, 1876.

up and down, just like a monkey, wanting to see the inside. I shall never forget the laugh he gave when at last he saw his own black face in it. The more he laughed the more his likeness laughed. He could not make it out. He imagined there was some one at the back of the glass.' The Patagonians do the same.

But these effects of the mirror on the *imagination* of man are by no means confined to savage man. They occur, under exceptional circumstances, among ourselves, in races the most highly civilised. Thus Galton writes:—'No less than nine anecdotes have reached me of a twin seeing his or her reflection in a looking-glass and addressing it in the belief it was the other twin in person.'

Certain startling assertions have been made regarding the effect of *pictorial representations* of persons, other animals or things, on the lower animals—assertions involving the highest possible compliments to the painter's skill—and the fidelity with which he copies nature. A type of these statements is to be found in the old classical story of the Greek artist, Zeuxis, outvying nature, in so far as birds preferred his painted grapes to real ones! The story itself is of course a poetical and complimentary exaggeration. But it is a fact that this celebrated Athenian excelled in the accuracy of his pictorial imitations of natural objects; that in Athens the works of the painters were often exhibited in the theatre, in the open air; and that the evidence of such modern artists as Millais shows that there is no improbability connected with the supposition that birds may have pecked at the painted grapes of Zeuxis, mistaking them for real ones.

Pierquin tells us that recognition of the *portraits* of masters, mistresses, or children-playfellows is common in the dog or cat, which show their identification of the resemblance with the original by licks or caresses. They lick the painted faces or hands of a dead master, just as they show a joyful recognition of the resemblance while he is alive, when, for instance, the portrait and the original are in the same room or stand side by side. But they also mistake portraits for their originals (Lee).

Such mistakes occur more usually, however, in relation

to the portraits of *other animals* of the same or of other species or genera. The marmozet (monkey) recognises pictorial representations of its own species or of other animals (Audouin), identifying them with the originals. The picture of a cat or wasp creates alarm, and it commits the error of snatching at painted representations of insects (Cassell). The Titi, too, commits the perhaps excusable mistake of regarding *engravings* as realities, showing thereby its recognition of likeness in the pictured representations of persons, animals or things (Humboldt). The performing dog Minos that was brought to London for exhibition in May, 1875, was said to be able to 'trace a likeness between *photographs*' and their originals. Hogg's dog Lion mistook a portrait of another dog for a real animal, and allowed itself to be excited thereby to angry rivalry, just as certain animals are annoyed at or with their own mirrored image. A correspondent of 'Science Gossip' mentions a Pomeranian dog that was excited by an almost life-size portrait. In short, according as the *portraits* are those of friends or foes, the resultant impression and expression are those of joy or fear.

Various statements have been made of parrots and other birds, and of certain insects, being deceived by *painted* representations of flowers or fruits. They are led into error apparently by the impressions on their sense of vision not being corrected by those of other senses. They are said to express their sense of the fidelity of the representation—to show the reality of their mistake, by the display of gratification, complacency, self-admiration, aversion, attack, fear, flight, or attempts to feed upon the tempting objects. The evidence at my command not being sufficient to convince myself in one direction or another, I ventured to apply to various distinguished *painters*, begging them to favour me with the results of any personal experience they might have had on the subject. Two replies reached me—fortunately representing opposite views—from artists whose names are a sufficient guarantee for the value of their remarks—Mr. Millais representing the affirmative and Mr. Hamerton the negative. The statements made in both cases are of sufficient interest to warrant my giving them *in extenso*.

Mr. Millais wrote me from London, in May, 1874: 'The only fact I can call to mind which may be of use to you was when I was painting in spring a picture which I called "Apple Blossoms." I painted the trees when they were in full flower, and, not being able to finish the work in one spring, I continued the picture the following spring, so that many of the flowers were quite dry. I should tell you that I had my canvas out in the orchard and worked direct from nature. I was perfectly annoyed by bees crawling over my canvas and *distinctly* going to the centre of my painted blossoms—those a year old and scentless—as well as the wet ones, which might have had attraction in the way of smell, from oil and turpentine. To my mind they *mistook the imitation for the real flower*. They were a great nuisance, and retarded my work, dragging their legs, clogged with white and pink paint, across the canvas. Some of the blossoms I painted in the foreground were nearly the real size, and to these they chiefly went.'

On the other hand, Mr. Hamerton, writing from the neighbourhood of Autun, department of the Saone-et-Loire, France, in July, 1874, remarks:—'So far as I have had opportunities for observing, I should say that animals do *not* recognise painting. I remember one instance, however, of a terrier which belonged to me, and which used to look at a painted portrait of a pointer, in a manner that convinced me she was interested in the representation. This is positively the only instance of recognition of painting by an animal that I can answer for. But even here the doubt remains whether the terrier thought the painted pointer was a dog, or only *some sort of animal on four legs*. We never can judge exactly of the *degree* of observation which animals are capable of. As to the stories like that of birds pecking fruit in the Greek painting, I simply do not believe them. They are myths, which would naturally form themselves in this way. One spectator would say that the fruit was painted so well that a bird would peck at it. This, when repeated, would soon take the form that a bird *had* pecked at it: afterwards that birds in general had pecked at it.'

'I have *tried* animals often with paintings, but uni-

formly without success. I should fancy that to be recognised by an animal, a painting should be executed on certain peculiar principles, divesting the representation as much as possible of everything likely to puzzle the animal—such as foreshortening effect, &c. Even human beings, entirely without culture, do not always easily recognise painted work, and the more consummate it is, the less they recognise it. Millais told me that many people could not understand foreshortening in drawing: so that if you foreshortened one arm, and not the other, they would ask, "Why have you made that one so short?"'

I have met with no recorded instances of animals of any kind recognising in any way pictures of *places*, or of *things*, other than articles of *food*.

Nor have I facts to show, whether or how far animals are deceived by the beautiful *artificial flowers* for which Parisian artistes are so famous, and which so frequently impose upon man, so long as he is guided merely by his distant vision. But the subject is one of much interest; and the flowers in question, like the mirror and pictures, open up an important means of experiment and field of inquiry to the comparative psychologist.

I have certainly been assured by the vendors of artificial flowers in ornamental pots, used for the purposes of drawing-room decoration, that bees and butterflies frequent these flowers, and the inference drawn is that the animals are paying an unwitting compliment to the fidelity with which the imitator has reproduced nature, so far as mere look is concerned. These, and other insects, however, alight upon dozens of other objects of the most opposite kinds that bear no sort of resemblance to flowers, and there is nothing at present approaching a proof that the animals above named, in such a case, mistake artificial flowers for real ones. The probability, however, is great that they do so. I have myself, over and over again, been deceived by the exquisite imitations of flowers made by foreign, and even by home artists, and I have repeatedly experimentally caused similar mistakes in other persons, all familiar with real flowers, by placing potted artificial and other flowers in drawing rooms or parlours.

Moreover, we have the analogy of the mirror, of paintings, of models, and of other mere *representations* or resemblances, in favour of the probability of the *self-deception* of birds, insects and other animals, by well-imitated artificial flowers.

There are some curious cases of *painted living animals* deceiving their fellows. Thus the skin of a living male ass has been painted so as to resemble that of a zebra, experimentally, with a view to deceiving a female zebra in pairing; and the ruse has succeeded, in so far as the latter animal has been induced to accept the attentions of the former (Baird). This kind of experiment might fitly be extended to other species and genera, and to other and higher phenomena than pairing.

Stuffed skins—and very inartistically stuffed—are quite successful in the capture of the ruff, acting as inanimate decoys. Even when 'executed in a very rude manner;' not at all life-like, moved by strings in jerks, representing jumps; simply stuffed with a wisp of straw, 'with no great attention to cover the straw beneath' by proper suture of the skin; 'rough as this preparation is, and as unlike a living bird, as skin and feathers can be made, it answers all the purpose' (Montagu): a fact that surely indicates, either great stupidity, much carelessness in observation, a very vivid imagination, or all three, on the part of the animals deceived.

Stuffed animals are used sometimes as decoys for wild ones. The London bird-catcher uses a 'dummy,' or dead stuffed bird, to deceive the male chaffinch (Greenwood).

A mother sheep, bereaved of her own lambs, has been deceived by putting the skin of one of her dead lambs on a living one of some other individual, under which circumstances she has accepted the unwitting *rôle* of foster-parent (Hogg).

Living imitations of their own form and gait deceive many unwary animals; thus the Australian aborigines successfully counterfeit, for the purpose of capture, the look and walk of the emu.

To this category belongs the usefulness of the human *scarecrow*, the very rude imitation of man, constructed by

the farmer and placed in his grain-field, as an intended deterrent to crows, or other birds. The effigy is efficient, or the reverse, in proportion to its artistic execution, its likeness to man. Dead, or stuffed birds are used for a similar purpose; but neither in the case of the human effigy, nor of the dead animal, is the intended deterrent uniformly successful. For there are always bold or inquisitive birds that cautiously venture on *investigation*, and thereby speedily convince themselves of the innocuousness of the scarecrow, whatever be its nature.

Models of animals—modelled imitations of animals of whatever kind—give rise to the same kind of mistakes. The most familiar forms of such models and of such mistakes are to be found in the apparatus of the angler, in his artificial bait, fish and flies. The salmon, trout, and other fish, in accepting the sportsman's artificial minnow, or fly, fail to distinguish between the imitation and the reality, the artificial and the natural; perhaps because of haste or greed giving no chance to powers of observation and investigation.

Wood mentions a dog that assaulted a pasteboard cat, and became much ashamed of its mistake; and in another chapter we have seen what a bitch did with an india-rubber toy, fashioned in the likeness of a pup. A monkey that mistook a *toy* snake, a mere *painted* model, or imitation of a very rude kind, for a real one, in its terror, nearly drowned itself (Cassell). Other monkeys have been quite paralysed with terror at the sight of a *stuffed* adder. A correspondent of 'Nature' describes the effect of presenting a stuffed leopard to a pet monkey. 'It would scream with terror, shut its eyes, and hide away in my friend's coat. On touching it with the claws, its terror was piteous. On removing the leopard it would slowly peep out, and on catching sight of it close its eyes tight.'

The representations of the living reality may be inanimate, and far-fetched; but in the absence of any keen observation, or of any examination, or reflection, on the part of the animal deceived, such an imitation may be quite as successful as the original, in producing a given result. Thus

an American correspondent of 'Nature' tells us that the common frog in the United States utters a particular cry, when alarmed by its enemy, the striped snake (*tropidonotus tama*, Dakay), and that 'sliding a stick after him, like a snake, will produce the same result, in a still more striking manner.'

Dr. Brown, speaking of the grampus, of Greenland, says, 'I know of a case in which they attacked a white-painted herring boat, in the Western Islands, probably mistaking it for a beluga,' or white whale.

The kitten is said to play with *shadows*, even its own, on the wall, mistaking them apparently for living, moving, but harmless realities. The celebrated French traveller, Le Vaillant, mentions a young monkey mistaking a *wig block* for its mother. The dog is sometimes deceived by false or *imitation fire*. Dance describes something of an opposite kind in a toad. He speaks of an Indian peon, in Venezuela, 'throwing live coals to a toad, which jumped forward at each throw, and caught the bright coals in its mouth, dropping one to take up another. The toad must have mistaken the coals for *fire flies*, and it was not deterred from hoping for better luck at each succeeding trial.'

The *protective disguises* of various plants and animals lead other animals into errors of non-observation, or faulty observation. Many seeds or seed-vessels, various insects, even huge animals such as the crocodile and alligator, are externally so like certain natural objects of an unattractive kind for food purposes, that they escape, or repulse the notice even of keen-eyed predatory birds.

Bates and Wallace, in particular, have shown how frequently, by means of what are called their *mimetic resemblances*, in colour or form, to the ground or grass, tree-barks, leaves, or twigs, certain insects secure immunity from their natural enemies—birds of various kinds. Many *phasmata* and *mantides* so resemble dry sticks as to be unrecognisable by man—even when he is on the outlook for them—unless they are in motion: as I found for myself in the New Zealand Bush many years ago. The leaf insect, so well described and figured by the late Andrew Murray, F.L.S., one of our

ablest and best-known entomologists, is a more beautiful, though scarcely more interesting example. The crocodile and alligator are mistaken for floating tree-trunks by unwary animals drinking on the banks of tropical rivers, and they sometimes pay by loss of life the penalty of their error. On the other hand, insects sometimes so closely resemble the droppings of birds, or spiders the axillary buds of plants, as to throw birds off their guard; thus enabling these protected insects and spiders to escape the usually keen vision of their bird enemies. The seed vessels of *medicago polymorpha* sometimes resemble caterpillars, and are mistaken for caterpillars by birds; while the seeds of *calendula* (marigold) also resemble a hairy caterpillar, and may thus deter some birds from preying upon them (Erasmus Darwin).

CHAPTER XXXIV.

DECEPTION.

It has been supposed and alleged that one of the patent differences between man and other animals is the transparency of motive, and the simplicity of conduct in the latter; their freedom from *hypocrisy*, or guile; their incapability of disguising their real feelings, or intentions, and their want of desire to conceal or misrepresent them; their blunt, obvious honesty. Thus Miss Cobbe speaks of the dog having a character 'pure and simple,' with no *conventionality*. And no doubt such a description may apply to some dogs; but it certainly does not apply to many, nor is it characteristic of the dog as a species. One of the many errors of novelists and poets, indeed, is regarding the dog as 'incapable of deceit'—with 'no share of man's falsehood.'

So far is this from being true that the dog, and certain other animals, are capable of wonderful refinements of hypocrisy and deceit, those which are associated with outward *politeness*, and with all the proprieties of behaviour. A white-faced monkey of Belt's, that did not relish certain insect-foods, 'was too polite not to take them when they were offered to him, and would sometimes smell them. But he invariably rolled them up in his hand, and dropped them quietly again after a few moments,' a procedure that has its parallel in the behaviour of even well-bred children with food they dislike.

If they do not *tell*, dogs at least elaborately, deliberately, and successfully *act, lies.*

There is a refined hypocrisy in the secret night-coursing or poaching of dogs for their own ends, when they slip

their necks out of a collar, escape from the kennel for hours, return as surreptitiously as they went, resuming their collar and their place in the kennel, and assuming before human visitors an air of perfect innocence and ignorance (Cassell, Low). And other night marauders resort to similar shifts to conceal or effect their purpose, knowing obviously that concealment is necessary and detection possible.

There is a wonderful amount of hypocrisy, too, in the invention of excuses for laziness, or for the avoidance of irksome work; in the ruses of the 'lazy dog,' or 'idle dog,' or 'dirty dog' to escape duty, or punishment—ruses that include the simulation of sleep, repose, fatigue, flight, wounds, illness, dying, or death!

Even *verbal* or oral deception occurs occasionally in the speech-gifted parrot, when it uses its gift, for instance, for the purpose of fun or mischief in practical jokes.

In point of fact, then, the lower animals, like man, practise *deceit* in a great variety of ways, and from a great variety of motives: some of the latter commendable, as self-defence, the preservation of life, escape from enemies or danger, the protection or amusement of the young, self-recreation; others reprehensible, as revenge, cupidity, wanton mischievousness, or cruelty. Illustrations of the many forms in which individual animals deceive each other, or man, are to be found in all kinds of—

Simulation, or dissimulation, including—

Feints or ruses;

Stratagems or manœuvres;

Pretence;

as these are embodied in games, practical jokes, theatrical performances; and as they are expressed sometimes, merely in look, as well as more generally by behaviour, which involves gesture, attitude and action. Only some of these forms of deception can be considered in the present chapter. But references to other forms may be found in the chapters on 'Practical Jokes,' 'Adaptiveness,' and 'Error.'

Perhaps the most familiar examples of deception practised by the lower animals are the varied forms of simulating or *feigning*—

1. Death or dying.
2. Disease or illness.
3. Disablement from accident, injury or wounds.
4. Strong emotion, especially misery or distress.
5. Sleep or repose.
6. Insensibility.
7. Play or inattention.
8. Preoccupation or intentness on occupation.
9. Ignorance.
10. Innocence.
11. Suffering, mentally or bodily—

the usual motives for which are—

1. The diversion of man or other animals from their young or their nests.

2. The securing of their own safety in presence of imminent danger.

It is notorious that many beetles—various *coleoptera*—many of the *Cantharideæ* and *Eryotylidæ*, and *Bromius vitis* (Baird), *feign death* in the presence of an enemy or of other danger, and obviously in order to escape therefrom. The crab also, like beetles, in terror or alarm—especially if sudden—on seizure by man, sometimes even on being touched, makes believe that it is defunct (Baird, Watson). The fox does the same (Drake), the elephant (Tennent, Watson), the young turkey ('Percy Anecdotes), and the polecat (Low), to escape threatened danger. A New Brunswick humming-bird and the jackal resort to the same feint or ruse on capture (Adams); and similar phenomena are exhibited by certain other birds, by snakes and spiders, by the rat, opossum, and other animals.

One of the commonest tricks that the dog is taught, is to feign itself dead, to allow its limbs, and whole carcase indeed, to be treated by man as if it were dead.

A North American opossum is called 'the dissimulator' from its well-known habit of feigning death. 'When attacked it rolls itself up like a ball, submits to be kicked and maltreated without moving; feigns death; lies on the ground with shut eyes, and cheats its assailants into the belief that it has been destroyed' (Audubon).

All these animals must realise their danger, must possess a *sense of danger*, must have generalised ideas of peril based on individual experiences, as well as a feeling of the desirability of escaping it, of consulting their personal safety, with a knowledge of the proper means of escape, and the power of instantly applying their knowledge. There are also involved such mental qualities as presence of mind or self-possession, self-command or *self-control*, fertility of resource or ingenuity, patience, reasoning, reflection, cunning.

The successful feigning of death is usually or frequently simply the assumption and maintenance of rigid *immobility*. But it does not follow, *per contra*, that such immobility, when voluntarily assumed, is so for the purpose of feigning death and of avoiding danger. In certain cases the cause, object or motive is of a very different kind. Thus the object may be to dissipate fear, if not to inspire confidence, in intended prey, so as to allow them to go on with their feeding or other occupations till the proper opportunity for capture arrives. This is the case, for instance, with a certain Nicaraguan hawk, in order to deceive his prey—small birds. He sits motionless on a tree-bough till his opportunity presents itself (Belt). On the other hand, a certain Nicaraguan locust, when suddenly surrounded by foraging ants, assumes immobility to save its life. Such was its maintenance of this condition, such its conviction, apparently, that its salvation depended on its motionlessness, 'that it allowed me to pick it up and replace it among the ants without making a single effort to escape,' says Belt. Berkeley mentions a young stoat lying still as death when her mother had been shot, and the dogs and hunters approached; which motionlessness may have been here, however, the paralysis, and resulting immobility, of fear or bewilderment in and from the suddenness of bereavement, and the presence of two classes of enemies.

A young merganser deceived the Duke of Argyll and a party of his visitors at Inverary, simply by remaining perfectly still on ground on which it was inconspicuous by reason of the protective resemblance or mimicry of its colour, a manœuvre involving great self-command in so young an

animal. Mrs. Burton speaks of a learned Syrian donkey that fell down 'and pretended to die,' allowing himself to be 'dragged about by his tail, ears and legs,' apparently as a mere piece of acting.

Many game and other birds feign lameness, or other forms of *disablement* from wounds, for the purpose of drawing the sportsman, or his dog, from the neighbourhood of their nests or young. They have a specific, intelligible and commendable object in view; and they attain it in the most ingenious, appropriate and successful way. To this category belong the familiar *stratagems*, or wiles, of the lapwing, corncraik and golden plover (Baird). The shore-lark counterfeits lameness, assumes a mimic wretchedness—involving the use of a plaintive note (Baird). The partridge decoys the dog by similar means (Markwick). The male especially trails its wing as if wounded before a dog that approaches its nest. The riverside bunting, skylark and yellow-hammer are other birds that lure man away from their nests or young by the personation of being wounded and helpless ('Science Gossip').

The ruffed grouse of North America feigns lameness to draw attention from its nest (Gillmore). Such feigning of disablement, for the purpose of luring man or other animals from the vicinity of their nests or young, is not uncommon in British small birds—in mother birds especially—for instance, the chaffinch ('Science Gossip'). The Duke of Argyll mentions a blackcap falling to the ground from a bush as if wounded, 'in order to distract attention from its nest.'

Of the great rock partridge of Tibet Prejevalsky says:—'If danger be near, particularly when the young are very small, the old birds will run about twenty paces from the sportsman and try to attract his attention by feigning lameness or illness, as our partridges will often do at home.'

The stickleback diverts from its nest any foe too powerful for its attack, using the artifice in such a case of engaging in 'the pursuit of an imaginary prey,' according to Coste.

Another mode of protecting nests is adopted by the trap-door *spider* of New Zealand, which, according to Gillies,

conceals them by 'a skilful and adroit piece of deception,' whereby 'bold imitation of prominent and noticeable features of the surface landscape' prevents either nest or entrance being observed. 'The evidences of thought, ingenuity and reason are displayed in the selection of the particular materials used in special places; in the calculation of the probabilities of certain contingencies happening; and in the apparently careless arrangement of both living and dead matter, so as to make what is in reality the *highest art* appear to be the result of natural and ordinary circumstances.'

In some cases there is 'a plant of green grass . . . . planted artificially, and growing on the lid.' In other cases 'you will find clay on the outside of the lid, plastered and smooth, or possibly with an *imitation crack*, introduced apparently at random.' In others, again, 'the skilful artist brings to his aid all the taste and knowledge of the practical gardener—selects plants suited for his purpose, brings them from a distance, and actually transplants them to the top of his trap-door with astonishingly natural variety and arrangement.' Or 'you will find mosses of various hues and colours growing green, and sometimes brown and dead upon the lid.' Or sometimes 'this tiny pasture is brilliantly ornamented with parti-coloured patches of lichens.' Or 'sprigs of lycopods, ferns or heath, veronicas, and white-berry plants are introduced to correspond with the bolder herbage around;' or, 'if the common white tussock is the prevailing vegetation in the locality . . . . . the dead bits (of that kind) of grass are woven adroitly into the trap-door or round its mouth, so as to deceive the most practised eye.'

'So, too, where roots or woody fibres, or bits of dead stick, are scattered over the ground, or protrude from the soil, this clever imitator will repeat the conditions on his lid, weaving these hard, foreign, and often clumsy materials into his trap-door in an irregular and apparently undesigned way. . . . . Hard seeds, and anything whatever covering the ground are reproduced in their natural attitudes in these clever pieces of deception. In fact, you will *never* find any two trap-doors exactly *the same*, even in any one locality and belonging to the same colony of spiders, except where surface

soil or clay simply is the covering. . . . . The wily creature, with his characteristic craft and cunning, selects what will suit (his purpose) at some distance, comparatively speaking, from the scene of his operations and brings it to his home and plants it.'

As 'an instance of how observant these animals are of peculiarities of situation, and of their power of *exact imitation* of these peculiarities,' he mentions a nest that occurred in a line of holes in the ground, made by rain drops. 'This cunning observer completes the series by adding one at its proper distance at the corner, which exactly imitates such holes. So complete was the deception, that though I and others must have seen this hole scores of times during a course of years, being in a much frequented and prominent position, we never thought it was anything else than a raindrop-hole, and it was not till the accident of my having dropped something at the spot led me to examine the hole narrowly, that I discovered it was in reality a trap-door spider's nest.' He speaks, in short, of the door of such a nest and its outer covering as a 'marvellous piece of deception,' and remarks that 'the simplicity and prominence of its mode of construction was the very perfection of concealment.'

With other specific and sufficient ends in view, the other *artifices* of the lower animals are both numerous and varied. Thus, in order to the *capture of prey*, some highly ingenious devices are exhibited. Reynard, in pursuit of his favourite prey—ducks—sometimes immerses himself in water up to his head, which he covers with a leafy bough, and, so disguised, slowly swims towards the unsuspecting birds (Watson, 'Animal World'). He also baits fowls with grain, so as to render them unsuspicious, or intent on their feeding, and to bring them within his range ('Animal World'). A Nicaraguan wasp, in hunting spiders, makes a sudden dart at the web. This has the effect of so startling or frightening the spider that it falls to the ground—that is, becomes free of its web, and is then pounced upon (Belt).

In the various *games* or sports of animals, and especially of the young, pretended or make-believe races and fights, trials of strength or speed, are not uncommon. Puppies at

play and in fun *pretend* to worry each other. The siamang has mock combats with its child playfellows, and the orang, in its romping with boys, engages in mimic scuffles (Cassell). Burns' 'Twa Dogs'

> Scoured away in long excursion,
> And worried ither *for Diversion.*

Dogs, too, offer each other mock *insults* in play, just as they do real ones when they are in serious earnest. Young rhinoceroses bite each other, like young dogs, in mere *play.*

Ravens strike or cuff each other in play (White). Mimic wrestling matches occur in young cocks for diversion; young goats and rams, like young dogs, all in perfect amity, make pretence of biting, attacking, worrying each other. Even young ants have their playful thrusts and wrestlings (Houzeau, Huber), their play and pretence.

All this involves a perception of the distinction between *jest and earnest.* Unfortunately, just as in children, there is the same tendency in the mimic fights of young cocks or sporting dogs for jest or sport to pass into earnest. And the consequences of such a transition are sometimes quite as serious or sad in other animals as in man. Thus certain old regimental horses that began in all amity the game of 'French and English,' which involved their dividing into two bodies and taking opposite or rival sides, ended by charging each other with determination, rage, fury, ferocity, and genuine animosity, the unfortunate result to some of them being dangerous wounds and even death ('Animal World').

In order to *theft,* to the possession of coveted articles of food especially, the Rhesus monkey feigns or acts sleep, illness, play, insensibility or preoccupation (Cassell). For the purpose of concealing their guilt, of throwing their human masters off the scent, and of disarming their suspicions, dogs and cats are capable of assuming the look and aspect, attitude or behaviour of *innocence.* Thus Mrs. Burton mentions a female bull pup of hers in Syria that, after a sly bite at the leg of a Jew, 'when no one was looking, ... instead of running away, sat looking the picture of innocence,' by both actions showing an obvious consciousness of wrong-doing and its consequences. *Demureness* may be real, but it is also

affected, pretended, or assumed. The meekness of the dog under censure is frequently affected, and even ostentatious. It is apt to feign misery under man's displeasure, especially if this displeasure is unmerited. And by the constant repetition of such acts of dissimulation it may become habitually deceitful (Cobbe). A mock *seriousness* is not uncommon in the parrot ('Animal World').

The stratagems, feints or ruses of many of the lower animals frequently involve a high degree or kind of unconscious *dramatic* action, of histrionic power or talent. The Duke of Argyll has described the theatrical nature of the feints of a common wild duck, to save its young, involving mimickry of the condition of being helplessly wounded. The partridge or the lapwing, in its feigning so as to protect its young or nest, may be regarded as a successful and consummate actor.

Romanes mentions a Skye terrier that, under his ridicule, intentional and experimental, tried to deceive its master by going through all the dramatic action of catching and killing a supposed fly, and then assuming an air of success. But when proof was shown that this action was known to be one of pretence, when he saw his hypocrisy detected, 'he slunk away under some furniture, evidently very much ashamed of himself.' The dog and cat go through the semblance or pretence of performing various other operations (Watson).

The dog and certain other animals display their *theatrical* aptitudes, however, in other more unmistakable ways. Thus the dog engages for its own amusement, or that of its young, and perhaps with its young, in impromptu dramas; it enacts charades of a sensational kind, with tragic fervour and imaginary victims. With a distinct object in view, he has no difficulty in enacting a 'scene.' Thus Watson describes one that acted a fight outside his master's door, in order to get his master to open the door to look out at or for the cause of disturbance—an opportunity that was at once seized to gain the coveted admission to the house. Again, begging in the dog is frequently an elaborate piece of acting. But it takes care always not to hurt itself (Cobbe).

And further, the histrionic power of the dog and many

other animals is capable of being *trained* or developed to wonderful perfection by man, so that they act or play their parts on the dramatic stage in the same way that man himself does. Successful animal *actors* include bears, horses, elephants and fleas, as well as dogs and certain birds, such as the parrot. The dog, for instance, is capable of assuming a great variety of characters. He makes pretence of death, poisoning, wounds, recovery, dignity or humility, all with equal ease. He engages in imaginary quarrels with perfect control of temper and a thorough understanding of the difference between the real and the fictitious. He exhibits suitable feeling or expression, as well as gesture, attitude or action, in his counterfeits, successfully simulating various passions or emotions. Counterfeiting the passions—such as anger or rage—in theatrical declamation or gesticulation was one of the accomplishments of Lady Davies' parroquet. Theatrical declamation is one of the many directions in which the clever parrot that can *speak* has a manifest advantage over the equally clever dog that cannot so express itself.

The various *tricks* or feats of performing dogs, as they are exhibited in the drawing-room, or on the public street, also embody dramatic ability and display. Street beggars' dogs, for instance, use all sorts of ingenious make-believe in their benevolent tricks; they 'act' sometimes so cleverly that their performances are entitled to rank as—and they sometimes also reap the merited reward of—a certain kind of 'high art.'

The whole phenomena then of theatrical or *dramatic representation* by animals illustrate certain forms of feigning or deception; while, on the other hand, all kinds of feigning in them may be regarded as *pro tanto* histrionic performances.

The phenomena of *imposture* by animals, on each other or on man, involve their taking due, or undue, or every advantage, in their dupes or victims, of such various mental qualities or states as ignorance, unpreparedness, fear, sympathy, good nature, or other feelings or emotions. And this *taking advantage* implies, in its turn, a knowledge of the value and use of *opportunity*, with promptitude of action in rendering it serviceable.

Artifice and artfulness, though they do not necessarily imply deception, usually include some of its varied forms. Thus a horse that shammed lameness, showed delight at the success of his artifice (Howitt).

Certain animals are systematically *trained* by man in the arts of deception, and become adepts, accomplished, therein, and thereby of the greatest service to man by co-operating with, or acting for, him, for his selfish or nefarious ends. Thus the lurcher (dog) is taught the means of deceiving man so as to become of service in poaching, smuggling and brigandage. He is fertile in the 'arts' of escaping detection—both as regards his master and himself (Low). And the same occurs in the sheep-stealing collie, when it has been trained as man's accomplice or confederate in nefarious schemes and practices. Again, the decoy elephant systematically diverts the attention of wild ones in order to lure them to their capture by man.

Though many of the deceptions practised by animals are *intentional*, they do not always or necessarily involve the idea of consciousness or deliberation, of deceiving for a specific purpose or definite end. Thus the parrot, starling, mocking bird, and many other birds, deceive man himself, as well as each other, by the fidelity with which they imitate the voice of man or the cries or notes of other animals.

But, though they sometimes make these imitations in order to deceive—for instance, in their practical jokes—they make them also when there is nobody—no other animal—to deceive, under circumstances, therefore, which do not admit of the supposition of intention to deceive, though a probable motive is their own amusement. This kind of imitation embraces the phenomena of *ventriloquism* in certain animals, which phenomena, with others that partly belong to the subject of the present chapter, will be found discussed in the chapter on 'Practical Jokes.'

If we take the trouble to *analyse* any, even of the simple, acts of deception above described, and still more so, if we select for critical examination those of a more complex character, such as trained theatrical or pantomimic performances, the mental qualities involved will be found to be not only

numerous and varied, but many of them of a high order. Thus one cannot fail to discover—

1. Abstraction or generalisation—in reference, for instance, to ideas of danger.

2. The adaptation of means to an end.

3. A knowledge of what is advantageous to the individual or those other individuals belonging to or associated with the actor. Thus Mrs. Siddons' cat shammed lameness from having found the pleasure of being petted in one real lameness (Wynter); just as children frequently make the most of trivial ailments, or invent ailments, in order to enjoy the pleasures attendant upon invalidism, including idleness, absence from school, gifts of toys, and the creature comforts of dietetic luxuries.

4. The distinction between the spurious and the real.

5. Imagination and
6. Imitation } in a high degree.

7. Inventiveness.

8. Consciousness of using deceit, as well as of being deceived.

9. Co-operation or confederacy for a common end or purpose.

Up to this point we have been considering deception by animals, either of each other or of man, the said deception being mainly intentional. But there are other kinds of deception that claim some consideration here, though they are more fully discussed in other chapters, such as those on 'Error' and 'Stupidity.' These are—

1. *Self-deception*—of course unintentional; and

2. *Deception by man*, in which the lower animals are man's dupes or victims, by unwarily falling into the errors to which he invites them.

Self-deception is constantly occurring no less in old than in young animals, in an almost infinite variety of ways; for instance, very commonly in the form of errors of the senses, or of interpretation of impressions on the senses, which impressions require interpretation, and sometimes correction, by other sensorial influences, or by the judgment and by experience, as in man.

Deception by man, though generally, is not necessarily intentional. It is *intentional* where his object is to—

1. Capture animals, for whatever purpose.
2. Torment them, as in his practical jokes.
3. Artificially to create fear, surprise, or other emotions or passions.
4. Study experimentally their mental aptitudes.

But it is *unintentional* where, for instance, he merely changes his dress, and the result is, in the dog, an error in distinguishing even his own master's identity.

The successful impostures of man include various deceptions of the *maternal instinct*. For instance, Romanes made a hen foster-mother to three orphaned ferrets; and he says he has heard that 'even such an intelligent animal as the bitch may be deceived into rearing a cat, and *vice versâ*,' if only the two mothers have littered on the same day. The success of man's deception depends on the *liability to error* that characterises the lower animal.

A doe-rabbit, to which was given, experimentally, a newborn ferret to suckle, 'perceived the imposture at once, and attacked the young ferret so savagely that she broke two of its legs before I could remove it' (Romanes).

Perhaps the most interesting feature in these attempts of man to outwit or cheat other animals is their frequent *failure* by reason of the intelligence, wariness, watchfulness, or ingenuity of the latter, which enables them so frequently to baffle or circumvent his powerful influence, sometimes even to turn the tables upon him. In the first place they frequently detect—see through man's pretence; they know when he is in fun or jest, when in earnest. In an actioned or acted *threat* by man, their conduct is guided by their belief as to whether he means what he threatens, as well as by their knowledge occasionally as to whether he has the power of doing what he threatens. Thus there is no pantomimic threat more common than a man pretending to be about to throw a stone at a dog.

Many, perhaps most, dogs confound the resemblance with the reality; they jump too hastily to the conclusion that what he threatens he intends and can fulfil; and they accord-

ingly seek safety in flight, or hesitate in their attack. But other dogs, more intelligent, good readers of human character, and well acquainted with all shades of their master's humour, find out in their own way that when a man goes through the pretended action of throwing a stone, he has none in his hand to throw, knowing, in certain cases, that there being no stones at hand to throw, there cannot be one in his hand (Houzeau). And the natural result of such belief or knowledge is that they do not take the trouble to get out of his way, showing, on the contrary, perfect unconcern. When, therefore, a master affects anger at some escapade, some amusing misdemeanour of a favourite dog, and makes believe to throw a stone at it, while, in truth, he is laughing at it, the dog probably realises at once that its master is 'just in fun.'

While there is a correct interpretation of man's natural tone of voice by the dog, or other animals, they are apt to be misled by his *assumed* tones, by his make-believe anger, reproof or harshness. But this is usually the case only for a time. In proportion as the animals know their master thoroughly, and are in the habit of closely observing all his habits of look, tone, and action, they become less and less liable to be deceived by his pretences.

The *success* of man's deceptions depends, on the one hand, on the unwariness, or stupidity, want of observation or reflection, of his dupe; and, on the other, on the excellence of his *imitations* of nature, of natural objects and sounds, of insects, in artificial flies, of bird-notes, in his artificial calls, of gait and appearance, in decking himself with skins, or covering himself with herbage, and in strutting, running, or moving like this or that animal. He has occasion to resort to a great variety of ingenious *devices*, as when he paints an ass's skin, so as to resemble a zebra's; or when he cheats the wary spider with sand grains, used as artificial midges. Miss Gordon Cumming tells us of an Indian ornithologist 'so perfectly skilled in imitating the calls of different rare birds, that the deluded victims respond, and coming close to the beguiling voice, pay the penalty of their curiosity.'

CHAPTER XXXV.

PRACTICAL JOKES.

CERTAIN animals, including species and genera so different as monkeys, apes, orangs and baboons, the dog, cat, horse, elephant, rabbit and squirrel, the parrot, mocking bird, starling, magpie, and goose, not only perpetrate practical jokes on each other, or on man, but they enter thoroughly into the spirit of the joke or fun: they enjoy, exult in their or its success.

The motive or object of the joke varies in different cases. It may be dictated simply by a spirit of mischief, or mischievousness in young animals; for instance in monkeys, which are proverbially so given to mere mischief-making, without, in general, any cruel or ulterior object in view, that troublesome children are commonly spoken of by their parents, as 'young monkeys,' 'mischievous monkeys,' or 'troublesome monkeys.' On the other hand, a practical joke may be the medium of expressing a very refined *revenge*, of inflicting a very condign *punishment*.

There was, for instance, very deliberate malice exhibited by the Rhesus monkey, that plucked alive a crow, and left it to be murdered by its own companions (Cassell).

Mischievousness or trickiness, including sometimes a decided love of, or propensity to, practical joking, is a common attribute of *youth*, in other animals, as in man. All young animals are naturally fond of fun and frolic; and their desire for amusement not unfrequently gratifies itself at the expense of the feelings of other individuals or species. Even in such cases, however, mischief or tricks, whether or not of the character of practical jokes, are usually innocuous, un-

less in the occasional case where *jest becomes earnest*, where what is begun in perfect good humour, terminates in irritability and quarrelsomeness. And in this latter event, what is comical at first, may become even tragical at last.

Among other pre-eminently mischievous animals may be enumerated the magpie (Baird). Trickiness is not uncommon, as a prominent feature, in the character of some of our cage birds (Buist). Mischievousness is a special attribute of certain monkeys, such as the titi, or the marmozet, which derives its main amusement from its destructiveness (Cassell).

Mischievousness, however, is not always simply ludicrous or amusing and innocuous. Nor does it always arise from youthful frolicsomeness. There is much mischievousness that is the product of mental perversion or disorder; much that is malicious in its character, and serious in its results. The squirrel plays on its companions practical jokes that are sometimes fatal (Cassell).

The parrot sometimes succeeds, just as man does, in setting cat and dog by the ears; and in such a case it is *morally responsible* for the result.

Certain practical jokes involve various *refinements of cruelty*, and an obvious delight in witnessing the effects of cruelty, the torture of victims. Crows enjoy the impotent fury of their victims (Hall). Monkeys show the 'keenest delight in torturing others, simply for torturing sake,' putting themselves to great trouble in order to gratify their instinct of cruelty. 'A naturalist, who had lived a long time in India, told me that he has not unfrequently seen monkeys feign death for an hour or two at a time, for the express purpose of inducing crows and other carnivorous birds to approach within grasping distance; and when one of the birds was caught, the delighted monkey put it to all kinds of agonies, of which plucking alive seemed to be a favourite' ('Nature'). The parrot, too, enjoys the punishment of another animal, perhaps for its misdemeanour or practical joke ('Animal World').

It does not follow that there is always, though there must be sometimes, realisation, or appreciation of the kind

or amount of *pain*, bodily or mental, that a victim is undergoing. Thus an American correspondent of 'Nature' describes a playful kitten as amusing itself by teasing a frog, 'seemingly for the purpose of hearing him cry.' Here there is a selfish amusement at the expense of suffering in another. But it is not at all likely that the kitten had any idea that it was inflicting pain, and that a cry was the natural expression of pain. Indeed, the simple teasing, or tormenting of animals by each other, though provocative of displays of temper, combativeness, retaliation, seldom involve the idea that *pain* is being inflicted and suffered.

Lady Verney writes of apes and monkeys, as seen at the Zoological Gardens, London: 'An ape will push a bit of apple or bun through his bars, just within reach of his neighbour, and draw it back again before he can get at it—going on for an hour at a time, for the mere delight of seeing the anger and distress and longing of the poor little victim. No other beast seems to have the wit, or the desire, to enjoy evil in this manner.' Here the pain inflicted is necessarily mental; but it is no less keen on that account. Pain of a purely bodily kind is produced, on the other hand, by a monkey driving a stick into the eye of a crocodile. 'He went to work with all the caution and seriousness of an old lawyer; and when he had inflicted the joke, he hauled himself aloft with an alacrity that showed he could form a very good estimation of the danger which he ran' (Lawson).

The success of practical jokes implies *deception* of, and *error* in the victims or dupes. Triumph, exultation, or delight, which is sometimes so evident, and is expressed in various ways, involves a clear perception of the nature of the trick or joke, and a consciousness of its success. Miss Cobbe describes the pæans in chorus of a flock of geese at the success of a practical joke of theirs on a number of pigs. The Rhesus monkey shows its triumph by chattering and grinning (Cassell). The parrot appreciates its own jokes, shows joy at least at its success in mischief (Houzeau, Watson). The elephant also enjoys its practical joking, that is, witnessing the effects thereof (Lee). The raven exhibits, as so many other birds do, delight at the success of its mimicry (Low).

Certain animals require *sympathy* in their joys, as in their griefs; and possibly their *love of admiration* in some cases must be gratified. Thus the orang plays pranks and delights in them; but only when it has spectators of its tricks (Cassell), when approval or applause would appear to be taken for granted.

Some practical jokes of the lower animals are apt to be as serious to man as to each other. Thus the 'Animal World' tells us of a sheep, whose fondness for practical fun led it to watch for unwary human bye-passers from the window of the second storey of a granary: and when one was passing immediately underneath the window, this eccentric animal would drop itself suddenly upon him, with all its weight of course. In this case the mischief was gratuitous. But in other cases the practical jokes of animals take the very appropriate form of the *punishment* of man for his misdeeds —perhaps for his practical jokes on them. The success and appropriateness of such punishment illustrate man's own proverbs, or sayings about 'the biter bit,' 'diamond cut diamond,' or 'more than his match.' Thus the elephant, dog and parrot sometimes inflict ingenious forms of punishment well deserved on boys or adults who have teased them.

The mode in which practical jokes are perpetrated by different species and genera varies greatly; and this variation involves great *ingenuity*, devising the most appropriate means in each case. An orang in a ship's galley, 'in order to play the cook a trick, used to turn the water cocks' (Büchner).

One of the commonest modes of perpetrating practical jokes is *mimicry*, imitation of the songs, cries, calls, voice-sounds of other animals, including man. But all mimicry does not involve *mockery*—the intention to 'make a fool' of another; to lead it into some mishap, to deceive it to its hurt, and to enjoy itself at the victim's expense. Even in the same animal, for instance the mocking bird itself, there may be either, or both, harmless mimicry, and deliberate mockery. And the mockery employed may involve genuine *derision*, studied insult. The mocking bird mocks, as well as mimics; it engages in deception, intentional, as well as

accidental; it possesses a sense of the *ludicrous*, or of fun; and it indulges in genuine practical jokes, just as the parrot more frequently and successfully does.

One of the forms again both of mimicry and mockery is *ventriloquism* in certain birds. Professor Sir Wyville Thomson informs us how a Brazilian parrot succeeded in making himself and a railway party, of which he was a member, believe they had run over a child. 'Suddenly the agonised cries of a child, followed by low moanings, rang out from under the wheels. A jerk of the drag pulled the car up, and nearly threw us out of our seats. We jumped out and looked nervously under the truck; but there was no child there.' Nor was the apparent accident explained, till 'a large green parrot, in a cage close beside us, went through, no doubt, another of his best performances in the shape of a loud mocking *laugh*.'

A male chat, described by Dr. Abbott, not only imitated successfully the notes, cries, groans, squeaks, or calls of different animals, including other birds, the squirrel, and the yelping bark of the puppy; not only could it mimic the 'dull creaking of a rusty sign-board,' and the 'cries of some poor creature in distress;' but all this 'mimicry of uncouth sounds' could be uttered as if by another individual in a distant tree, 'throwing his voice in every direction, other than towards the nest;' so that his notes appeared as if coming 'from a point several yards distant.' In this case the animal was 'thoroughly conscious of its ventriloquial power' and its effects—deception thereby; and it 'trusted far more to it than to flight, to avoid and mislead its enemies.' It was not surprising that it succeeded in deceiving the naturalist-observer, as well as birds of various kinds, that approached its nest.

The artificial production of consternation, alarm, *fear* or fright is one of the common modes resorted to by the parrot and other animals, of playing their tricks, pranks, or jokes (Watson).

The practical jokes of *man* on other animals; the various tricks that he plays upon them, mainly for the purposes of what he considers 'sport,' may be fitly considered here.

Such jokes take advantage of certain mental or moral peculiarities, or individualities, of the animals he selects as the subject of his experiments, the victims too frequently of his cruelty. These mostly mental peculiarities include, for instance, irritability, pugnacity, liability to fear and panic, ignorance, unsuspiciousness, confidence, curiosity, greed, love of alcohol or other articles of man's food or drink, or known partiality to certain natural foods. But while fully appreciating, and frequently taking undue advantage of such mental qualities, man is too apt to overlook certain others, and his oversight leads him to be forgetful of the possible results to himself, as well as to his animal dupes, of his ill-timed pleasantries.

Thus he gives his victims no credit for their memory of injury, their sense of indignation at affront or abuse, the keenness and the impetuosity of their passions, their thirst for revenge, their power of selecting the proper means of inflicting condign punishment for offence, their capacity to impute blame where it is deserved, their patience in waiting for, and their sagacity in seizing opportunity, their promptitude of action when the watched-for opportunity arrives.

Hence the fatal injuries, of which we so frequently read, inflicted by horses, elephants and dogs, or by various menagerie animals, on those persons who have wilfully tormented them. Thus we are told of a boy, killed outright by an elephant, as the effect of teasing it ('Animal World'). When men or boys give elephants stones instead of expected nuts, unsuspiciousness or inexperience of man's treachery may lead the sagacious animal into error for the moment. But discovery of the deception is very speedy; the animal's anger or resentment is unmistakably exhibited; and man's stupidity—for he may have erred but in thoughtlessness, not in cruel intention—has thus stimulated his victim to revenge by murder.

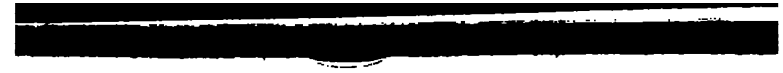
Man's pleasantries or practical jokes are at all times liable to be misunderstood and resented, even by animals that are familiar with the player of the joke. Though, as has been already shown, certain animals can, and do distinguish *between jest*, joke, fun, frolic, pretence, *and earnest*,

reality, seriousness, there are others that naturally confound the two; or they may be at a loss, as children, and even men so frequently are, to discriminate between them. There is apt to result, in such cases, especially in touchy, testy, captive animals, a dangerous and instantaneous loss of temper and patience, a sense of irritation likely to lead to acts of retaliation or punishment.

Repeated acts of annoyance are of course correspondingly more liable to beget furiosity. So that there is always danger to man himself from his tormenting, teasing, irritating, annoying, torturing or tempting even such docile much-suffering animals as the elephant, horse and dog, and still more so the captious and captive inmates of menageries or Zoological Gardens, or of drawing-room aviaries.

On the other hand, the consequences to the animals experimented on are sometimes equally unexpected and unintended by man. Thus a wild forest bear, to which some American-Indian huntsmen fastened a buffalo bell, was 'found dead of fright and starvation' fifty miles distant from the place where the obnoxious and alarmingly sonorous instrument was attached to its neck, as an official informs us.

Some of man's modes of capture of the lower animals have all the aspect and effect of practical jokes. When, for instance, he wishes to capture old wary monkeys, he first gets hold, sometimes, of a few unwary young ones, paints them over with a mixture of treacle and tartar emetic, and then sets them free. The joyful parents lick their recovered offspring, with the natural result that they suffer, as man would do under similar circumstances, from a prostrating nausea that renders them an easy prey to man (Cassell). He may have other objects in view in the perpetration of his practical jokes on other animals; for instance, when his purpose is to purchase the silence of a barking dog or cackling goose, that would otherwise be a tell-tale to his nocturnal burglary or poaching.



RECENT PUBLICATIONS.

I.

The Data of Ethics.

Being the First Part of the "Principles of Morality." By HERBERT SPENCER. 1 vol., 12mo. Cloth. Price, $1.50.

Mr. Spencer's main purpose is to ascertain and describe the objective qualities of right conduct, the external signs of the highest virtue, and to show their coincidence with the results of progressive evolution. This he has done in the course of the profound and exhaustive analysis, of which he is so consummate a master, of vigorous but singularly lucid reasonings, and of ample and impressive illustrations from every department of Nature." —*N. Y. Tribune.*

II.

Early Christian Literature Primers.

Edited by Professor GEORGE PARK FISHER, D. D.

I. The Apostolic Fathers, and the Apologists, A. D. 95–180. By the Rev. GEORGE A. JACKSON. 16mo. Cloth. Price, 60 cents.

The "Early Christian Literature Primers" will embody, in a few small and inexpensive volumes, the substance of the characteristic works of the great Fathers of the Church. The plan recognizes four groups of works:

1. The Apostolic Fathers and the Apologists, A. D. 95–180. (*Now ready.*)
2. The Fathers of the Third Century, A. D. 180–325.
3. The Post-Nicene Greek Fathers, A. D. 325–750.
4. The Post-Nicene Latin Fathers, A. D. 325–590.

These groups are to be embraced in four books. In the first book are given exact translations of the principal works of the Apostolic Fathers and the Apologists, preceded by introductions upon the writings of the period, and by sketches of the several authors. Nearly every known author of the period is mentioned, and his place pointed out.

III.

The Development of English Literature.

The Old English Period. By Brother AZARIAS, Professor of English Literature in Rock Hill College, Maryland. 1 vol., 12mo, 214 pages. Cloth. Price, $1.25.

IV.

The Life of His Royal Highness the Prince Consort.

By THEODORE MARTIN. With Portraits. Vol. IV. 1 vol., 12mo. Cloth. Price, $2.00.

V.

Essays from the "North American Review."

Edited by ALLEN THORNDIKE RICE. One vol., 12mo, 482 pages. Cloth, price, $2.00.

"The Essays collected in this volume may, without pretension, be truly said to represent the growth of native thought and scholarship in the United States from the close of the second war with Great Britain down to the close of the great Civil War. In few libraries, public or private, can complete sets of the 'North American Review' be found, and the best thoughts and the freshest activity of two generations of conspicuous American writers have thus remained inaccessible to the great mass of the American reading public."—*Extract from Preface.*

VI.

The Spectator.

A new edition carefully revised. With Prefaces Historical and Biographical, by ALEXANDER CHALMERS, A. M.

This is an *édition de luxe* of "The Spectator," being printed in large type, on choice paper, in perfect style, and bound in vellum cloth with gilt top, after the manner now so popular with standard books. In six volumes, 8vo. Cloth. Price, $12.00.

For sale by all booksellers. Any work sent post or carriage free, to any address in the United States, on receipt of price.

D. APPLETON & CO., 1, 3, & 5 Bond St., New York.

WORKS OF HENRY MAUDSLEY, M. D.,

Fellow of the Royal College of Physicians; Professor of Medical Jurisprudence in University College, London.

Body and Mind:

An Inquiry into their Connection and Mutual Influence, specially in reference to Mental Disorders. 1 vol., 12mo. Cloth, $1.50.

Physiology of the Mind.

New edition. 1 vol., 12mo. Cloth, $2.00. CONTENTS: Chapter I. On the Method of the Study of the Mind.—II. The Mind and the Nervous System.—III. The Spinal Cord, or Tertiary Nervous Centres; or, Nervous Centres of Reflex Action.—IV. Secondary Nervous Centres; or Sensory Ganglia; Sensorium Commune.—V. Hemispherical Ganglia; Cortical Cells of the Cerebral Hemispheres; Ideational Nervous Centres; Primary Nervous Centres; Intellectorium Commune.—VI. The Emotions.—VII. Volition.—VIII. Motor Nervous Centres, or Motorium Commune and Actuation or Effection.—IX. Memory and Imagination.

Pathology of the Mind.

1 vol., 12mo. Cloth, $2.00. CONTENTS: Chapter I. On the Causes of Insanity.—II. On the Insanity of Early Life.—III. On the Varieties of Insanity.—IV. On the Pathology of Insanity.—V. On the Diagnosis of Insanity.—VI. On the Prognosis of Insanity.—VII. On the Treatment of Insanity.

Responsibility in Mental Disease.

(*International Scientific Series.*) 1 vol., 12mo. Cloth, $1.50.

"Having lectured in a medical college on Mental Disease, this book has been a feast to us. It handles a great subject in a masterly manner, and, in our judgment, the positions taken by the author are correct and well sustained."—*Pastor and People.*

"The author is at home in his subject, and presents his views in an almost singularly clear and satisfactory manner. . . . The volume is a valuable contribution to one of the most difficult, and at the same time one of the most important subjects of investigation at the present day."—*N. Y. Observer.*

"It is a work profound and searching, and abounds in wisdom."—*Pittsburg Commercial.*

"Handles the important topic with masterly power, and its suggestions are practical and of great value."—*Providence Press.*

For sale by all booksellers. Any volume mailed, post-paid, to any address in the United States, on receipt of price.

D. APPLETON & CO., Publishers, 1, 3, & 5 Bond Street, New York.

INTERNATIONAL SCIENTIFIC SERIES.

NOW READY. In 12mo and bound in cloth.

I. FORMS OF WATER, in Clouds, Rain, Rivers, Ice, and Glaciers. By Prof. JOHN TYNDALL. $1.50.

II. PHYSICS AND POLITICS; or, Thoughts on the Application of the Principles of "Natural Selection" and "Inheritance" to Political Society. By WALTER BAGEHOT. $1.50.

III. FOODS. By EDWARD SMITH, M. D., LL. B., F. R. S. $1.75.

IV. MIND AND BODY. By ALEXANDER BAIN, LL. D. $1.50.

V. THE STUDY OF SOCIOLOGY. By HERBERT SPENCER. $1.50.

VI. THE NEW CHEMISTRY. By Prof. JOSIAH P. COOKE, Jr., of Harvard University. $2.00.

VII. THE CONSERVATION OF ENERGY. By Prof. BALFOUR STEWART, LL. D., F. R. S. $1.50.

VIII. ANIMAL LOCOMOTION; or, Walking, Swimming, and Flying, with a Dissertation on Aëronautics. By J. B. PETTIGREW, M. D. Illustrated. $1.75.

IX. RESPONSIBILITY IN MENTAL DISEASE. By H. MAUDSLEY, M. D. $1.50.

X. THE SCIENCE OF LAW. By Prof. SHELDON AMOS. $1.75.

XI. ANIMAL MECHANISM. A Treatise on Terrestrial and Aërial Locomotion. By E. J. MAREY. 117 Illustrations. $1.75.

XII. THE HISTORY OF THE CONFLICT BETWEEN RELIGION AND SCIENCE. By JOHN WILLIAM DRAPER, M. D., LL. D. $1.75.

XIII. THE DOCTRINE OF DESCENT, AND DARWINISM. By Prof. OSCAR SCHMIDT, of Strasburg University. $1.50.

XIV. THE CHEMISTRY OF LIGHT AND PHOTOGRAPHY. By Dr. HERMANN VOGEL. 100 Illustrations. $2.00.

XV. FUNGI; their Nature, Influence, and Uses. By M. C. COOKE, LL. D. Edited by M. J. BERKELEY. 109 Illustrations. $1.50.

XVI. THE LIFE AND GROWTH OF LANGUAGE. By Prof. W. D. WHITNEY, of Yale College. $1.50.

XVII. MONEY AND THE MECHANISM OF EXCHANGE. By W. STANLEY JEVONS, M. A., F. R. S. $1.75.

XVIII. THE NATURE OF LIGHT, with an Account of Physical Optics. By Dr. E. LOMMEL, Professor in the University of Erlangen. 88 Illustrations and a Plate of Spectra in Chromo-lithography. $2.00.

XIX. ANIMAL PARASITES AND MESSMATES. By M. VAN BENEDEN, Professor of the University of Louvain. 83 Illustrations. $1.50.

XX. ON FERMENTATIONS. By P. SCHÜTZENBERGER, Director at the Chemical Laboratory at the Sorbonne. 28 Illustrations. $1.50.

XXI. THE FIVE SENSES OF MAN. By J. BERNSTEIN, O. O. Professor in the University of Halle. 91 Illustrations. $1.75.

XXII. THE THEORY OF SOUND IN ITS RELATION TO MUSIC. By Prof. PIETRO BLASERNA, of the Royal University of Rome. Numerous Woodcuts. $1.50.

XXIII. STUDIES IN SPECTRUM ANALYSIS. By J. NORMAN LOCKYER. Illustrations. $2.50.

XXIV. A HISTORY OF THE GROWTH OF THE STEAM-ENGINE. By ROBERT H. THURSTON, A. M., C. E., Professor of Mechanical Engineering. 163 Illustrations. $2.50.

XXV. EDUCATION AS A SCIENCE. By ALEXANDER BAIN, LL. D., Professor of Logic in the University of Aberdeen. $1.75.

XXVI. MODERN CHROMATICS, with Applications to Art and Industry. By OGDEN N. ROOD, Professor of Physics in Columbia College. 130 original Illustrations. $2.00.

XXVII. THE HUMAN SPECIES. By A. DE QUATREFAGES, Professor of Anthropology in the Museum of Natural History, Paris.

D. APPLETON & CO., Publishers, 1, 3, & 5 Bond Street, New York.

THE

EXPERIMENTAL SCIENCE SERIES.

In neat 12mo volumes, bound in cloth, fully illustrated. Price per volume, $1.00.

THIS series of scientific books for boys, girls, and students of every age, was designed by Professor Alfred M. Mayer, Ph. D., of the Stevens Institute of Technology, Hoboken, New Jersey. Every book is addressed directly to the young student, and he is taught to construct his own apparatus out of the cheapest and most common materials to be found. Should the reader make all the apparatus described in the first book of this series, he will spend only $12.40.

NOW READY:

I.—LIGHT:

A Series of Simple, Entertaining, and Inexpensive Experiments in the Phenomena of Light, for Students of every Age.

By ALFRED M. MAYER and CHARLES BARNARD.

II.—SOUND:

A Series of Simple, Entertaining, and Inexpensive Experiments in the Phenomena of Sound, for the Use of Students of every Age.

By ALFRED MARSHALL MAYER,

Professor of Physics in the Stevens Institute of Technology; Member of the National Academy of Sciences; of the American Philosophical Society, Philadelphia; of the American Academy of Arts and Sciences, Boston; of the New York Academy of Sciences; of the German Astronomical Society; of the American Otological Society; and Honorary Member of the New York Ophthalmological Society.

IN ACTIVE PREPARATION:

III. Vision and the Nature of Light.
IV. Electricity and Magnetism.
V. Heat.
VI. Mechanics.
VII. Chemistry.
VIII. The Art of experimenting with Cheap and Simple Instruments.

D. APPLETON & CO., PUBLISHERS, 1, 3, & 5 BOND STREET, NEW YORK.